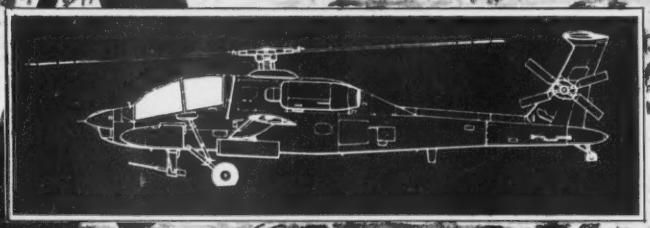
UNITED STATES ARMY

JANUARY 1979

AVIATION DIGEST



UNITED STATES ARMY
AVIATION DIGEST
JANUARY 1979
VOLUME 25 NUMBER 1

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ABOUT THE COVER

The cover shows the Army's AH-64 attack helicopter which is the subject of the interview with Brigadier General Edward M. Browne starting on page 2. Illustration by Fred Martin

Richard K. Tierney
Editor

The mission of the ***U.S. Army Aviation Digest (USPS 415-350)*** is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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Articles, photos and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, ***U.S. Army Aviation Digest,*** Fort Rucker, AL 36362.

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AAPR – 78

THE ARMY AVIATION Systems Program Review concluded last month at the U.S. Army Aviation Center, Ft. Rucker, AL after 2 days of lively presentations and discussions covering all aspects of Army aviation.

MG James C. Smith, then commander of the Aviation Center, opened the proceedings on 4 December by welcoming military and civilian personnel from throughout the Army. Heading the list of attendees were Generals Frederick J. Kroesen, Vice Chief of Staff, U.S. Army; John R. Guthrie, Commander, U.S. Army Materiel Development and Readiness Command; Robert M. Shoemaker, Commander, U.S. Army Forces Command; and Donn A. Starry, Commander, U.S. Army Training and Doctrine Command. Major General James H. Merryman who assumed command of the Aviation Center on 11 December (See "Hail and Farewell," December 1978 *Aviation Digest*) also was present as a TRADOC representative.

In his opening remarks, General Smith reviewed the goals of AAPR-74 (See November and December 1974 *Aviation Digest*) and discussed current systems and priorities. He also described the new methodology used and the conference's relationship to the Army Aviation Employment Conference (AVNEC) held last March (See November 1978 *Aviation Digest*).

The conference also included the threat to Army aviation systems; a battle combined arms scenario; the current and future force structure; and joint service programs.

Discussions held after presentations resulted in an invaluable exchange of views from among the many commands and agencies having proponent interests in Army aviation. Results and goals of AAPR-78 will be carried in future issues of the *Aviation Digest*.

The Mix

Will the AAH replace the AH-1S Cobra? If not, how do you see the AAH/AH-1 mix?

General Browne: The AAH is not programed to replace the AH-1S. There will be a high/low mix of about 536 AAHs and 1,000 AH-1Ss. Some units may have their AH-1Ss replaced by AAHs and some AAH units will be formed from scratch. I know of no plans to intermix these two attack helicopters in the same company, but we may well see a mix of AAH and AH-1S companies in some battalions.

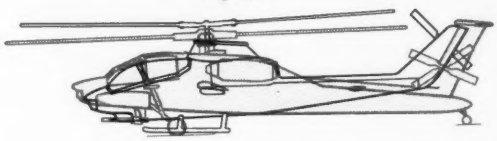
AAH versus AH-1

How does the AAH compare to the AH-1S?

General Browne: Let me address this by comparing the major areas of interest. In general, the AAH has greater firepower and standoff, has a night and adverse weather capability, is more survivable, more reliable and more maintainable. Greater firepower and standoff is provided by the combination of the HELLFIRE missile system, 2.75 inch aerial rocket system and the 30

AAH/AH-1S Size Comparison

Figure 1



	YAH-64	AH-1S
Rotor Diameter	48 feet	44 feet
Overall Length (Rotor Turning)	57 feet 7 inches	52 feet 11 inches
Width	17 feet 2 inches	10 feet 8 inches
Height	12 feet 7 inches	13 feet 5 inches

An Interview With The AAH PM

On The Attack Helicopter

BG Edward M. Browne

The triad that makes the advanced attack helicopter a total system for battle consists of the hardware, tactics and training. This interview concentrates on the hardware: the helicopter, its mission equipment packages, its systems and its supportability. A future issue will carry an interview with the TRADOC System Manager, COL Bob Mills, who is responsible for the doctrine, tactics and training required to employ the AH-64 in the field

Static ground firing of 30 mm chain gun

millimeter area weapons system integrated through a unique target acquisition and designation system and fire control system. The major cockpit improvements include more space and human factors engineering in all man-machine interfaces. Crew stations are totally integrated through the use of multiplexed integration of all mission equipment subsystems controls and displays. Although the AAH is more lethal, survivable and sophisticated than the AH-1S, it is not much bigger (see figure 1).

AAH Systems In The AH-1S

Since the AAH is not to be fielded for several years, will any of the new systems be incorporated into the AH-1?

General Browne: The AH-1 universal turret is designed to accept either the 20 mm or 30 mm area weapons subsystem. Technical assessments are ongoing to determine the risks of equipping the AH-1 with the Hughes 30 mm chain gun. A laser spot tracker also is planned for the AH-1. It is important to remember that the AH-1 has been product improved in the "G" to "S" conversion resulting in only marginal space available and power reserve.

Primary Mission Configuration

Will you please discuss the primary mission configuration and profile?

General Browne: The primary mission configuration and profile represents the minimum acceptable performance at the Army hot day ambient condition of 4,000 feet and 95 degrees Fahrenheit. The primary mission configuration consists of 8 HELLFIRE missiles, 320 to 500 rounds of 30 mm ammunition, and fuel for 1.83 hours of flight. The TRADOC-developed profile consists of 1.33 hours of NOE flight that varies from hover out of ground effect to airspeeds of 150 knots which represents a typical mission and 30 minutes reserve fuel. The 1.83 hours is sufficient to accomplish the typical antiarmor mission. The aircraft has

On The Attack Helicopter

LEFT: AH-64 armed with 16 HELLFIRE missiles
BELOW: AH-64 firing 2.75 inch rocket

a 2.5-hour fuel capability which can be used depending upon ordnance mix and the ambient condition.

Why does the AAH have twin engines?

General Browne: Twin engines provide a measure of survivability and safety. When twin engines are properly separated, there is a greater assurance that both engines will not be rendered inoperable by a burst of weapons fire. Having two engines allows the crew the capability of continuing the mission on a single engine, or to execute a power on autorotation. Either way, the crew would have the capability to return to the FARRP or home base.

Single Engine

What is the single engine performance?

General Browne: Single engine level flight speed at intermediate rated power, 4,000 feet and 95 degrees Fahrenheit, at a primary mission gross weight of 14,043 pounds (8 HELLFIRE missiles, 320 rounds of 30 mm ammunition, 1.83 hours of fuel) is 108 knots. The helicopter will hover on a single engine in ground effect at sea level, standard day conditions at primary mission gross weight. When the helicopter is unable to fly on a single engine, a power-on descent would be executed, ordnance downloaded and the helicopter flown to safety on a single engine.

What are the flight characteristics of the AAH?

General Browne: The AH-64 is very agile and highly maneuverable. Minimum performance is 450 feet per minute vertical rate of climb and 145 knots true airspeed in the primary mission configuration with a dash speed of up to 175 knots. Agility and maneuverability are provided by its: .5 negative "G"; .25 to .35 lateral "G"; .45 acceleration; and .5 deceleration longitudinal capabilities.

What is the importance of the vertical rate of climb when we fly in the NOE environment?

General Browne: The VROC is an indicator of the power reserve which is available to provide agility, maneuverability and the reserve power for emergencies.

Weapons And Ordnance

What combinations of weapons and ordnance can be carried on the AAH?

General Browne: The AH-64 is capable of carrying 16 HELLFIRE missiles or 76 2.75 inch aerial rockets and 1,200 rounds of 30 mm, while the (temperate) configuration is 16 HELLFIRE missiles and 1,200 rounds of 30 mm. Aerial rockets can be carried in lieu of the HELLFIRE missile. Various combinations are available based on the meteorological factors shown in figure 2.

Why do we need rockets and 30 mm on the AAH?

General Browne: They provide flexibility in servicing the variety of lightly armored vehicles and personnel targets. Additionally, they can be used for suppression of air defense targets. They also provide an air-to-air and self-defense capability.

Hellfire

When 16 HELLFIRE missiles are onboard, what options are available for engaging targets?

General Browne: The AH-64 is capable of operating in the autonomous or cooperative mode. In the autonomous (direct) mode, single and multiple targets can be engaged with single or rapid multiple firings. The cooperative mode can be fired either direct or indirect with laser designation provided by an ASH, another AAH or a remote ground designator. With cooperative designation, the HELLFIRE missile can be fired very rapidly with multiple target engagements.

How are multiple missiles fired?

General Browne: First, laser codes are stored in the fire control computer and selected in flight as required. In the rapid fire autonomous mode, two or more missiles are launched on the same code with time separation. After destruction of the first target, the designator is shifted to the next target. The missile will turn to follow the laser beam and strike the illuminated target.

Figure 2

AAH ARMAMENT OPTIONS = MISSION FLEXIBILITY

MISSION				PERFORMANCE VROC	V CRUISE	ENDURANCE
ANTI-ARMOR (DEFENSE) DESERT PRIMARY MISSION 4000'/95°F	4 HF	320 RDS	4 HF	700 FPM	146 KTS	1.83 HRS
TEMPERATE ALTERNATE 2000'/70°F	8 HF	1200 RDS	8 HF	600 FPM	146 KTS	2.5 HRS
COVERING FORCE (AIR CAV) DESERT ALTERNATE 4000'/95°F	4 HF	777 RDS	4 HF	450 FPM	146 KTS	1.83 HRS
TEMPERATE ALTERNATE 2000'/70°F	4 HF 19 RKTS	1148 RDS	4 HF 19 RKTS	450 FPM	146 KTS	2.5 HRS
AIRMOBILE ESCORT DESERT ALTERNATE (4000'/95°F)	19 RKTS	416 RDS	19 RKTS	450 FPM	146 KTS	1.83 HRS
TEMPERATE ALTERNATE (2000'/70°F)	38 RKTS	786 RDS	38 RKTS	450 FPM	146 KTS	2.5 HRS

Hellfire Seekers

What is the status of the other seekers planned for the HELLFIRE missile?

General Browne: The Fire and Forget Seeker and the Air Defense Suppression Seeker are planned for early development.

Was the 30 mm chain gun developed for the AAH?

General Browne: The chain gun concept originally was developed for the ground vehicle application, specifically the 7.62 mm COAX machinegun for the tank, but the first operational chain gun was the 30 mm specifically designed for the AH-64. The Hughes chain gun family includes the 7.62 mm, 25 mm and the 30 mm.

30 mm Rounds

What ammunition will be available for the 30 mm area weapon subsystem?

General Browne: We are developing two new rounds, the XM788 training practice and XM789 high explosive dual purpose rounds. The HEDP will be much more lethal than our present rounds. Both the TP and HEDP will be interoperable with the NATO ADEN and DEFA cannons.

How are the onboard weapons subsystems employed?

General Browne: Both crewmembers have the capability to fire all onboard weapons. The HELLFIRE is fired in the autonomous mode with the TADS by the copilot/gunner. The pilot can fire the HELLFIRE in the cooperative mode in an emergency. Both the 30 mm and rocket subsystems can be fired with the TADS or the Helmet Mounted Sights.

Rearm and Refuel

How much time is required to rearm, refuel and turn the AAH around in the FARRP?

General Browne: The AH-64 is designed to be able to be rearmed with eight HELLFIRE missiles in 5 minutes, and 1,200 rounds of 30 mm in 10 minutes. It takes 4 minutes to fully refuel the AAH with the pressure system. Assuming all three functions are performed concurrently, it would take 10 minutes to rearm and refuel.

What capabilities are provided by the PNVS?

General Browne: The Pilot Night Vision System provides the crew, through the use of the common forward looking infrared (FLIR) modules, the capability to conduct all tactical missions during night and adverse weather. The 30 degree by 40 degree field of view in the Helmet Mounted Display with the appropriate symbology allows for hover flight, NOE flight and target engagements of all onboard weapons.

How does the FLIR compare to the night vision goggles?

General Browne: The FLIR in the TADS/PNVS will operate in absolute darkness, whereas the night vision goggles require one-fourth moonlight or more ambient illumination. The FLIR does not bloom due to weapons firing or flares, but the night vision goggles do bloom. The FLIR does have depth perception

cues provided by perspective size comparison of the FLIR imagery.

PNVS And Wires

Does the PNVS have the capability of detecting wires?

General Browne: The FLIR in some cases can detect large power lines; but, as a general rule, it cannot detect wires. However, the FLIR is capable of detecting towers and poles which are good cues to the location of wires. Efforts are ongoing pertaining to wire detectors and wire cutting devices for helicopters.

Can the FLIR be used in daylight?

General Browne: Yes, it is an excellent cueing device for target acquisition for daytime use. It also will assist in detecting camouflaged targets and will provide assistance in marginal weather and decreased visibility.

Are there any vision problems associated with FLIR technology and the other TADS sensors?

General Browne: The Army Aeromedical Research Laboratory at Ft. Rucker, AL is studying this area in detail; no major problems have been found. There are no long-term effects of using the sensors. Eye safe filters are provided in the TADS to protect the copilot/gunner from laser reflections. A laser safety device for the pilot is still under study.

PNVS And The Cockpit

Can the pilot see inside the cockpit when using the PNVS?

General Browne: Yes, the pilot can see inside the cockpit either by using the eye which is not being presented with the PNVS imagery display or by viewing directly through the PNVS imagery. I might add that there are no problems associated with transitioning from the PNVS to normal vision inside the cockpit.

What navigation equipment will be onboard the AAH?

General Browne: The navigation package for the AH-64 consists of the Lightweight Doppler Navigation System in conjunction with the inertial Heading Attitude Reference System and the ADF radio capability. An aid to NOE navigation or projected map display will be evaluated for possible incorporation in the future.

Can the AAH communicate at NOE?

General Browne: The current configuration provides for two improved FM radios, one VHF and one UHF radio. A high frequency (HF SSB) radio could be accommodated in the future if this becomes a requirement for good NOE communications.

What accounts for the proclaimed survivability and invulnerability of the AAH?

General Browne: The AAHs survivability and invulnerability are enhanced through greater standoff, lateral and vertical agility, redundant engine and flight controls, infrared paint and suppressor, armor protection, ballistic tolerant components and crashworthy design. These features make it a tough, survivable and lethal weapon system.

Crashworthy Features

How crashworthy is the AAH?

General Browne: AAH crashworthy design requirements focused on crew survival and the repair of crash-damaged aircraft. In design of the AH-64 we have been able to maintain these requirements while minimizing airframe deformation through progressive absorption and deformation of the landing gear, airframe structure and energy absorbing crewseats. The 95 percent survivability goal is 42 feet per second (30 miles per hour) vertical impact.

Redundant Systems

What systems are redundant on the AAH?

General Browne: Redundancy has been provided for all vital AH-64 systems. There are two independent hydraulic systems for cyclic, collective and directional controls. There are two a. c. generators, each capable of supplying the total required electrical power. The AAH also has twin engines and back-up fly-by-wire flight controls.

What is the maintenance philosophy for the AAH?

General Browne: The AH-64 is designed for the three level maintenance concept of AVUM, AVIM and depot. At unit level (AVUM) maintenance will be limited to the removal and replacement of components and line replaceable units (black boxes). Removal and replacement of subassemblies and modules and some minor repair will be the extent of maintenance at intermediate (AVIM) level. Extensive repair and rebuild will be accomplished at depot.

Maintenance Skill Level

With the introduction of the sophisticated technologies and subsystems on the AAH, what are the skill requirements of the maintenance personnel?

General Browne: The actual skill requirements have been reduced for the AVUM and AVIM maintenance personnel because the AH-64 is "designed for maintenance." Built-in test equipment, fault detection/location system, automatic test equipment, and the skill performance aids negate the need for people to come into the system as highly trained master mechanics. However, the system will require some specialization.

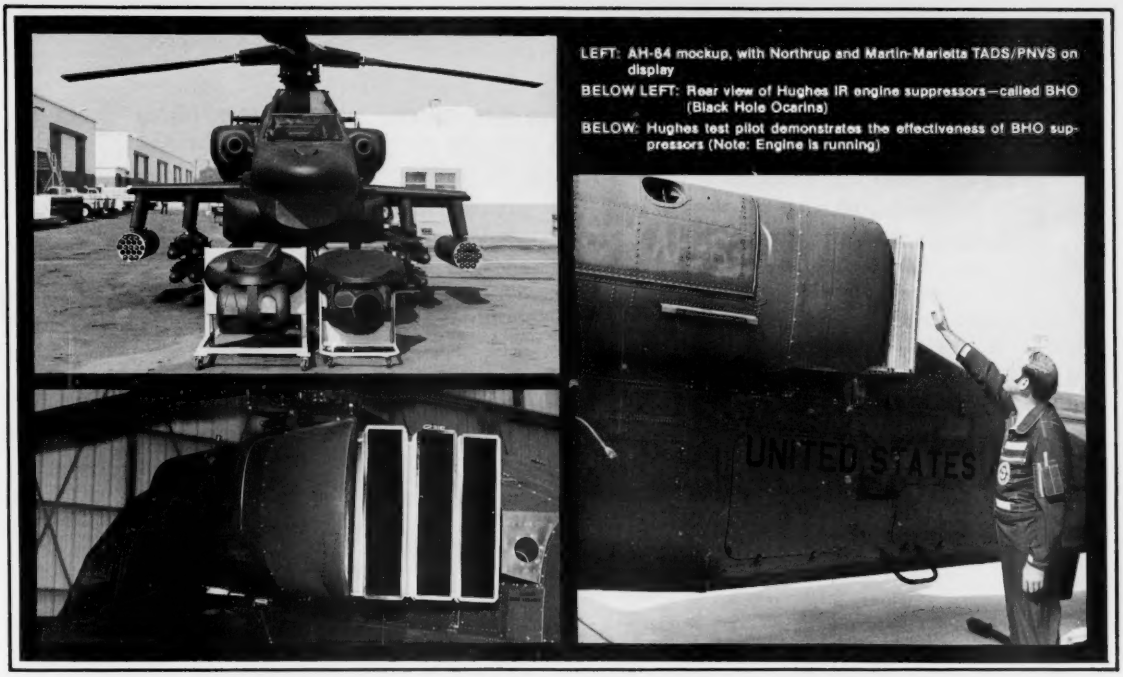
Scheduled Maintenance

What scheduled maintenance do you anticipate?

General Browne: The AAH is programed for a phase maintenance concept with components changed "on condition." The present prediction is 8.9 hours.

What is required to deploy the AAH?

General Browne: With auxiliary fuel tanks, the AH-64 has an 820 nautical mile ferry range against a



LEFT: AH-64 mockup, with Northrup and Martin-Marietta TADS/PNVS on display

BELOW LEFT: Rear view of Hughes IR engine suppressors—called BHO (Black Hole Ocarina)

BELOW: Hughes test pilot demonstrates the effectiveness of BHO suppressors (Note: Engine is running)

20 knot headwind which permits the AAH to be self-deployed to Europe from North America. The AH-64 is transportable in U.S. Air Force C-141 and C-5 aircraft. It takes six people 3 hours to prepare and load six AH-64s into a C-5.

Aviation Digest: General Browne, in behalf of its readers the ***Aviation Digest*** thanks you for sharing this information about the AAH.

Glossary

AAH	**advanced attack helicopter**
a.c.	**alternating current**
ADEN	**British version of the DEFA**
ADF	**automatic direction finder**
ASH	**advanced scout helicopter**
AVIM	**aviation intermediate maintenance**
AVUM	**aviation unit maintenance**
DEFA	**French 30 mm gun system for fighter aircraft**
FARRP	**forward area refueling and rearming point**
FLIR	**forward looking infrared**
FM	**frequency modulated**
HEDP	**high explosive dual purpose**
HELLFIRE	**helicopter launched fire and forget**
LDNS	**Lightweight Doppler Navigation System**
mm	**millimeter**
NATO	**North Atlantic Treaty Organization**
NOE	**nap-of-the-earth**
PM	**program manager**
PNVS	**Pilot Night Vision System**
TADS	**target acquisition and designation system**
TP	**training practice**
TRADOC	**U.S. Army Training and Doctrine Command**
UHF	**ultra high frequency**
VHF	**very high frequency**
VROC	**vertical rate of climb**

Brigadier General Edward M. Browne, a dual rated Master Army Aviator, has served the full spectrum of Transportation Corps aviation assignments. They include command of an aviation maintenance unit, Staff Officer at Eighth Army, First Field Forces, Vietnam and Department of the Army.

He attended the U.S. Army Command and General Staff College, and U.S. Air Force Air War College where he was honored as a Distinguished Graduate.

While attending the Air War College, he was selected by Department of the Army to enter the key procurement officer advanced degree program. General Browne attended the Florida Institute of Technology where he enrolled in two Master of Science (MS) programs concurrently, and earned MS degrees in procurement and contracts management, and systems management.

In December 1968 he was selected as Project Manager, Light Observation Helicopter Systems (LOHS). During his assignment as Project Manager, LOHS and Quiet Aircraft Systems (YO-3A), General Browne was awarded the Armed Forces Management Association's Management Award for major contributions to the improvement of the materiel acquisition process, and received the Legion of Merit for his accomplishments as project manager of those systems.

Upon completion of his studies at Florida Institute of Technology, General Browne was appointed Project Manager Designee for the Advanced Scout Helicopter System at the U.S. Army Aviation Systems Command, St. Louis, MO. He worked with Department of the Army and the U.S. Army Training and Doctrine Command for 17 months in the advanced scout helicopter program concept formulation. On 11 September 1975 the program was approved by the Defense Systems Acquisition Review Committee and the Office of the Project Manager, Advanced Scout Helicopter, formally was established on 12 September 1975 with General Browne confirmed as the Project Manager. On 1 June 1976 he was reassigned to his present position as Program Manager of the Advanced Attack Helicopter Program.

Single-engine operation of twin-engine aircraft can pose some "hairy" problems, especially when engine failure occurs on takeoff. Awareness of the problem and its effects on aircraft performance and controllability along with knowledge and pilot skill are vital prerequisites for successfully coping with such an emergency. How about you? Do you know what to do . . .

OF THE 26 Army fixed wing accidents that occurred during the past two fiscal years, nine happened while multiengine aircraft were being flown with one engine inoperative. These nine accidents claimed 17 lives, or 65 percent of the 26 fatalities that resulted from fixed wing mishaps during this time frame.

Analysis of these accidents reveals a serious misunderstanding among Army aviators concerning single-engine performance of twin-engine aircraft. While we ensure a pilot learns to operate his aircraft with one engine inoperative, we fail to make certain he understands all the ramifications the loss of an engine imposes upon his aircraft, and depending on the phase of flight that the loss occurs, his need to immediately and correctly respond. Nor does the operators manual provide the pilot with any meaningful information concerning this matter.

Before we can understand single-engine performance of Army twin-engine aircraft, we must first be aware of all the factors involved. Let's briefly consider our aircraft. With the exception of the OV-1 and the RU-21, all our standard fixed wing aircraft are bought "off the shelf." At procurement, these aircraft are all certifiable, although not necessarily certified, in accordance with Federal Aviation Regulation (FAR), Part 23, "Airworthiness Standards: Normal Utility and Acrobatic Airplanes," and meet the criteria stipulated for normal or utility category.

FAR 23 requires all turboprop aircraft and those with reciprocating engines to demonstrate single-engine climb capability at a pressure altitude of 5,000 feet, with the aircraft in a clean configuration. This criteria must be met by the described aircraft if they weigh more than 6,000 pounds and have a stall speed greater than 61 knots CAS. The U-8, U-21 and C-12 fall into this category, and in fact, do have a single-engine climb capability. The T-42, which has a maximum gross weight of 5,100 pounds (less than 6,000), falls into another category. The only requirement stipulated for this aircraft is that single-engine performance be *determined* at a pressure altitude of 5,000 feet. But no performance criteria are specified to be met. Fortunately, the T-42 does have a single-engine climb capability.

Many of our aviators are operating under the misconception that a twin-engine aircraft is nothing more than a single-engine aircraft with its power divided into two equal packages. While this may be true in terms of engine power, it is not true in terms of aircraft performance. In reality, when we lose an engine, we lose approximately 80 percent of the climb performance capability of that aircraft. (See table 1 for climb performance loss of standard fixed wing aircraft with one engine inoperative.) Because of this tremendous loss of performance, we can readily understand the reasoning behind our single-engine emergency procedures. For example, it is essential that we *promptly* perform all "immediate action" items to eliminate drag when one engine fails; for as the accompanying table shows, the percent of climb performance that remains is only valid after the propeller on the inoperative engine has been feathered, and the gear and flaps are retracted. Our failure to promptly perform these actions could prove disastrous.

Takeoff is the most critical phase for the pilot of a twin-engine aircraft. If an engine fails, he *may* have the option of continued flight. However, there is *nothing* in FAR 23 which stipulates that these aircraft must be capable of flying in takeoff configuration (maintaining altitude) with one engine inoperative. Although the U-21 and C-12 generally afford us this capability, the loss of an engine during takeoff in a U-8 or T-42, under many conditions, may mean that we are about to become the first persons to arrive at the scene of an aircraft accident. Climb capability in a takeoff configuration can readily be determined from the single-engine climb chart in the operators manual. In most instances, it is marginal at best.

Another area we should consider is minimum control airspeed (Vmc). FAR 23 defines Vmc as "the minimum calibrated airspeed at which, when an engine is suddenly made inoperative, it is possible to recover control of the airplane with that engine still inoperative, and maintain straight flight, either with zero yaw, or, at the option of the manufacturer, with an angle of bank of not more than 5 degrees." Vmc may not be higher than 1.2 times the stall speed, with flaps in takeoff position and the gear retracted. During flight tests, Vmc is determined with takeoff or METO (maximum except for takeoff) power on each engine, the rearmost allowable center of gravity, flaps in takeoff position, landing gear retracted and the propeller of the inoperative engine windmilling with the propeller set in takeoff range (high rpm) or feathered if the aircraft has an automatic feathering device such as that found on the U-21. During recovery, the aircraft may not assume any dangerous attitude or require any exceptional piloting skill, alertness, or strength to prevent a heading change of more than 20 degrees.

Vmc is not all that mysterious. It is simply that speed below which airflow past the rudder is reduced to such an extent that rudder forces cannot overcome the asymmetrical

Captain Charles K. Griffin

When Captain Griffin wrote this article, he was a fixed wing systems manager with the Directorate for Aviation Systems Management, U.S. Army Agency for Aviation Safety. He is now assigned to the U.S. Military Training Mission, Saudi Arabia.

Portions of this article were adapted from an article published in *Business and Commercial Aviation* magazine.

TABLE 1.–Performance Loss of Standard Army Fixed Wing With One Engine Out*

CONDITIONS: Weight: Maximum gross Press Alt: Sea Level OAT: +10° C.	Acft	Dual Engine Climb (fpm)	Single Engine Climb (fpm)	Percent Loss
	T-42A	1450	300	81
	U-8F	1520	218	86
	U-21A	2000	460	77
	C-12A	2200	630	71

*Propeller on inoperative engine feathered, and gear and flaps retracted.

forces caused by takeoff power on one side and a windmilling propeller on the other. When that speed is reached and the nose starts to swing toward the inoperative engine, our only hope of regaining control is to *reduce* power on the good engine and increase the airspeed. An increase in airspeed requires a change in momentum (aircraft attitude), and consequently, a certain period of time to become effective. This time period must be kept to a minimum by quick pilot reaction to prevent loss of aircraft control. If we perform our takeoffs as described in the current Aircrew Training Manual for Utility Airplanes, TC 1-145, our airspeed will be above Vmc prior to takeoff. Today, we no longer perform such hairy antics as "maximum performance takeoffs" where we find ourselves flying below Vmc, praying that nothing goes wrong. Accident statistics show that it just isn't worth the risk to constantly expose ourselves in this manner.

Maybe we don't know as much about this area of flight operations as we should. Maybe it's time to get back to the books and start boning up. Unfortunately, Army publications provide less than adequate information concerning this vital area of flight. However, an excellent place to start looking is at your local FAA GADO (General Aviation District Office), where several excellent publications on single-engine performance are available. One particularly good one is entitled "Always Leave Yourself An Out!" Here, the author presents five basic rules for multiengine pilots. Slightly modified for Army flying techniques, they are as follows:

Rule 1 — Never allow the airspeed to drop below published Vmc except during the last few yards of the landing flare, and then only if the field is extremely short.

Rule 2 — A best angle of climb speed that is lower than Vmc is an *emergency* speed and should be used near the ground *only* if you are willing to bet your life that one engine won't quit during the climb.

Rule 3 — Use the liftoff speed (Vlof) in the operators manual.

Rule 4 — After leaving the ground, rotate to the best rate of climb speed for the first 500 feet. It is essential to gain altitude rapidly in the event of engine failure.

Rule 5 — Be a skeptic when reading the performance charts in the operators manual, and be sure to read all the fine print. Realize that those charts are based on a *new* aircraft. Army overhaul and rebuild specifications are less than those required for a new engine. Therefore, performance may be slightly less than stated.

After reading up on the subject, we should refer to the ATM and learn the description and performance of the tasks that we are required to know. In the area of single-engine operations we find six tasks, three of which we are required to perform.

Under this program we are required to perform semiannual iterations of these maneuvers. However, they must be conducted under the supervision of an instructor pilot. Therefore, commanders must establish a training program in which flying hours, aircraft and IPs are available for the training of aviators. Once this has been done, each of us is responsible for maintaining proficiency in these maneuvers.

Task No.	Description
4001	Perform flight at minimum control airspeed (Vmc), single engine.
*4002	Perform emergency procedures for engine failure during cruise flight.
*4003	Perform single-engine landing.
4004	Perform single-engine go-around.
*4005	Perform emergency procedures for engine failure during takeoff.
4006	Perform emergency procedures for engine failure during final approach.

***Mandatory AAPART evaluation tasks**

Should the day come when we lose an engine, especially on takeoff, we won't have time to ask questions or consult manuals. We had better know what to do. And there is no better time than now to brush up on single-engine operations; for the day may, indeed, come when we find ourselves with only one!

DETERMINING CLIMB PERFORMANCE LOSS

Climb performance lost during single-engine operation of twin-engine aircraft under a variety of existing conditions may be determined by use of appropriate operators manuals as follows:

1. From single-engine climb chart, determine single-engine rate of climb in feet per minute.
2. Determine horsepower per engine at maximum rate of climb, using appropriate twin-engine chart.
3. From same chart, find maximum horsepower available per engine.
4. Subtract horsepower per engine figure from maximum horsepower per engine.
5. Enter remainder into climb/descent chart to find maximum rate of climb in feet per minute, with both engines operating.
6. Using the figures obtained from the above steps, solve the following equation.

$$100 - \left(\frac{\text{single-engine rate of climb}}{\text{dual-engine rate of climb}} \times 100\right) = \text{Percent of climb performance lost}$$

Example:

GIVEN: U-21 aircraft
9,000 pounds gross weight
10° C. OAT
4,000 feet pressure altitude

TO FIND: Percent of climb performance lost during single-engine operation.

PROCEDURE:

1. Using single-engine climb chart (page 7-29 of operators manual), we note rate of climb on one engine to be 600 fpm.
2. Referring to cruise chart (page 7-42), we find the maximum-rate-of-climb line intercepts the 9,000 pounds line at 180 horsepower per engine, and the maximum horsepower line is at 530 horsepower per engine.
3. Taking the difference between 530 hp and 180 hp, we enter the remainder—350 hp—on the climb/descent chart on page 7-67, noting that at 9,000 pounds, the rate of climb will be 1,850 feet per minute.
4. Substituting these figures, we complete the equation as follows:

$$100 - \left(\frac{600}{1850} \times 100\right) = 77.6\% \text{ climb performance lost}$$

Under the stipulated conditions, the climb performance remaining following the loss of one engine on the U-21A is 22.4%.*

*Assuming propeller on inoperative engine is feathered and gear and flaps retracted.

. . . we should still train to see, navigate and talk without using radios . . . in combat

Please . . . . Don't Give Us ANOTHER Radio

LTC Charles W. Abbey
Department of Flight Training
U.S. Army Aviation Center
Fort Rucker, AL

IT'S AMAZING HOW the thought process can be stimulated by simply being subjected to a short documentary. I viewed a movie in an aviation safety meeting the other day which suggested that people have some very serious limitations on our ability to sense, recognize, evaluate and act to control problem situations frequently encountered in today's sophisticated aircraft. The film suggested that we should be very critical in our evaluation of new aircraft design and equipment. This will ensure that we keep them as simple and uncluttered as possible to avoid building a flying machine that we are incapable of safely handling.

As a military consumer I often read articles or advertisements about new pieces of military hardware which will vastly simplify or enhance one or another of our tasks. When I read I am impressed, and as the mental bell rings I am convinced that I want the new tool. Then, when I have a sober moment from the intoxicating array of available new iron, I often wonder how the people of early American history ever did without. Think of those deprived pioneers and Soldiers of days-gone-by – they really had it rough!

Remember Dan Boone? He is reputed to have taught fellow pioneers how to "see" how to navigate in the wilderness and how to communicate. That's pretty good I'd say, especially considering how unsophisticated they were in those days.

Accounts of almost uncanny scouting ability and "keener than most" vision abound in American frontier legend and fact. Those legendary figures relied upon their *wits, eyes, ears, noses* and *throats* to accomplish their "missions." No modern black box technology to help them here! They learned, practiced and shared many tricks of their trade. For instance, they learned that similar to the camera and film we know today, the trained *eye* will detect more detail if given the proper exposure and time. Of course, they had never heard of the camera and had to figure it all out by themselves, with no help from technology.

Historians tell us that one of the famous Cavalry scouts, old Jim Bridger, really had an exasperating time with the Army officers who had to verify his sightings. The stories indicate that when gazing at buffalo or signs of Indians, Mr. Bridger would select a sheltered spot where he could recline comfortably and view the area of his interest.

After carefully scanning the entire panorama, his field of vision narrowed to a fixed stare at a specific area. As he prolonged his viewing in this manner, the more minute detail soon became obvious to him: a wisp of smoke or dust, a flash from the seat of a brave's deerhide

skivvies, a slight movement, a bit of color or an unusual shape. By piecing together the sighting with his mental store of knowledge and experience, he reasoned and reported a conclusion, which was usually correct. But, as accounts go, the "shave tail" would say something bright like, "Aw, I don't see nuttin" and they would all ride off into the ambush.

We may soon be faced with the same kinds of problems which faced Mr. Boone and Mr. Bridger . . . *See the enemy! Know Where The Enemy Is! Tell Others About It!* In a quite hostile environment this may strain—possibly even negate—our modern black box technology.

I believe we should still train to see, navigate and talk without using radios as a useful and necessary form of "insurance" in combat. Committees designing the Army's equipment for the future might take note.

See The Enemy!

Target designation may jog the memory for those of you who have ever tried to teach a young person how to shoot squirrel with a .22 rifle in a densely vegetated forest. How do you subtlely point out a camouflaged enemy tank well back in a busy woodline at 2,200 meters? How about 500 meters? (Would you believe 25 feet?) It is a problem, especially in a battlefield "hand-off" situation, if your laser target designator has a bullet hole in it. It's a fairly rough dilemma often reducing itself to the old "by the green tree next to the bush at the end of the brownish field" trick. Dan and Jim didn't have any innovative solutions to target designation except to practice doing it.

Eye drill and the resulting keen eye sight was nothing new to air cavalry aeroscouts during the Vietnam era. It was most often used by members of the nap-of-the-earth flying helicopter crew who used the tactical map while having a "circuit breaker out" situation on all the electronic navigational gear. Total familiarity with the terrain, thorough map study and terrain visualization was the key to learning in that situation.

Target designation is still a difficult problem for everyone. Besides using grid coordinates, with super-accurate map reading, and short of dropping an 8-inch round next to the target, we are still at the "green tree" level. The laser designator may clearly be our best bet for this one, as well as answering our range estimation dilemma.

Know Where The Enemy Is!

Let us talk about *land navigation.* Unfortunately, many Soldiers today can barely read a road map and have difficulty finding themselves in the middle of Interstate 75. Many Soldiers can't tell the difference between a valley and a ridge without 5 minutes study time. Yet we spend many hours in our service schools attempting to train our young service members to read and follow a map. Perhaps we need a new emphasis on developing map reading skill at all grade levels—an emphasis that will develop total familiarity with one's maps and its symbols. The introduction of "orienteering" into military land navigation training may have been a fundamental step in that direction.

People of Dan and Jim's ilk would have loved the "moving map" salespersons of today. You get this little black box that fits right onto the pommel and shows you just where you are at all times. Neat-O!

Today we're evaluating several outstanding Doppler and inertial navigation systems for our helicopters and other vehicles that will give us our coordinates in little red numbers at the push of a button. Those things are nice, but when the circuit breaker pops, will the war be over? Not likely. The aviators with the broken gadgets will still need to know where they are. Better hope they remember their maps.

Tell Others About It!

Communications on the sophisticated battlefield may be hampered by enemy countermeasures such as jamming or direction-finder-directed artillery. No fun at all. Many active Army and Reserve component units today are seriously experimenting with hand and arm signals, flash cards, wire and other simple, but effective, radio substitutes. (See "Send A Message," July 1978 ***Aviation Digest***). Maybe we ought to bring back the motorcycle messenger to all Army units. *Don't give us an extra radio to communicate with—give us a dependable alternative.*

When industry says, "Such a deal I have got for you—we've got total monitored programing; parallel reciprocal contingencies; functional, logistical, timephase and synchronized, third-generation flexibility," I believe that we should ask, "What is the alternative?"

Perhaps we should pause to see if vigorous *training* in some of the fundamental military skills or a more functional procedure may offer an attractive backup or alternative. On the sophisticated modern battlefield the black boxes may be essential—but, certainly, so are the fundamentals.

The corner hardware store sells an easy to use, laborsaving, powersaw that can save hours of work and a lot of blisters—but the really good carpenter always will carry a handsaw for the job where the powersaw can't cut it.

We should all respect the new technology and equipment, the challenges they present and the capabilities they give us. But I suggest that too great (or complacent) a reliance on that technology may catch us unprepared to cope with the hard realities of combat. It also can be a detriment costing us dearly (and unnecessarily) in space, weight and power in future equipment.

Those units training to "win the first battle" may be well advised to devote some of their scarce training time to the obvious fundamentals which contribute to the unit's ability to *see, navigate* and *communicate.*

Major Wavie C. Sharp was the Eighth U.S. Army Aviation Standardization Officer with the 17th Aviation Group (Combat), Seoul, Korea, when he prepared this article. He currently is assigned to HHD, U.S. Army Transportation School Brigade, Ft. Eustis, VA, serving as officer in charge, 67-CMF lesson plans quality control

Appointment With KOREA

Major Wavie C. Sharp

GOOD MORNING Ma'am! Is this TC Branch? I have an appointment with MAJ Goodsell and is —

"Yes, Lt Askyou. Let's see . . . It's Jimbo Askyou from Ft. Bragg isn't it? Mmmm . . . yes . . . here are your records. Would you like to review them before you see MAJ Goodsell?"

"No thank you, Ma'am. I just reviewed my records last month. I just need to talk to the major about my assignment."

"Very well, I'll tell him you're here. Won't you make yourself comfortable?"

Lt Askyou continues to stand, fearful of wrinkling his uniform, perspiring nervously, he shuts out the sound of the receptionist as she calls MAJ Goodsell. His eyes take on a slightly glassy look as he thinks, "Geez, what am I doing here? This guy is going to blow his stack when I tell him I don't want to to go Korea. What can I say? What kind of reasons will he listen to? Why don't I want to go? That's funny, I really don't know. It's just . . . a feeling. I guess it started last week, when MAJ Goodsell called. Why did he have to catch me in operations? One minute I'm filing an IFR flight plan for my instrument renewal—and the next minute I'm sitting with a dead phone in my hand—notified and congratulated concerning my assignment in Korea, and half the officers in the unit offering condolences. Why would they —"

"Jimbo, it's good to see you again. How are things at Ft. Bragg?"

"Oh, fine sir!" Snapping to attention, Lt Askyou extends his records, withdraws them, changes hands and finally manages to shake the hand offered by MAJ Goodsell.

"You want to talk about your assignment? OK, come with me." MAJ Goodsell turns, strides purposefully out of the office and down the hall. Lt Askyou follows, trying to keep up without running. Stopping at a closed door, MAJ Goodsell produces a key, unlocks the door and enters. Lt Askyou follows closely behind.

Both officers take seats at a small bare table, in a room with light green walls and ceiling and a worn brick red carpet on the floor.

MAJ Goodsell speaks, "So, you want to talk about your assignment to Korea. Well, you're a fortunate young man. This is probably the greatest opportunity of your career. Of course you're aware of the drawdown; if you hadn't been eligible to move this year you might have missed one of the most challenging assignments in the Army.

"I guess you're wondering about the specifics on your assignment. Well, I can help you there. I'm sorry I didn't have time to give you more information last week when I called you. First of all, you are being assigned to the Military Personnel Center-Korea. We assign you there, rather than to a specific unit, to

facilitate their mission of keeping all of the U.S. units in Korea as combat ready as possible.

"Changing requirements between the time you receive orders in the States and your arrival in Korea might mean that you would have to be diverted upon arrival anyway. So, unfortunately, you won't know for sure where you'll be assigned until you receive a welcome letter from your new unit.

"You do know a few things for sure, however; you are being assigned against an operational flying slot and in control specialty 71. That means you'll definitely go to an aviation unit, and in all probability, at your grade and experience level, you'll be assigned as an assistant maintenance officer or tech supply officer in a service platoon. With a lot of hard work and the heads up, can do, attitude you've displayed on your present assignment, you might even get a shot at service platoon leader.

"Now, I'm sure you'd like to know what kind of aviation units are located in Korea. Of course, everyone knows that the 2d Infantry Division is the backbone of the American fighting force in Korea, and the "Second to None" division has a large chunk of all U.S. aviation assets in Korea. Then too, there is the 2d Aviation Battalion, where you could be assigned in either HHC, A or B company to fly and maintain UH-1 Hueys and OH-58 Kiowas.

"You might even be assigned to E company, the Direct Support Aviation Maintenance Company which supports all 2d Division aviation assets. Although to be honest with you, since you aren't Cobra rated, your chances of this are lessened, because E company supports the 4th of the 7th Cavalry and most pilots assigned to the 702d are AH-1 Cobra rated.

"Also in 2d Infantry Division, you could be assigned as an OH-58 pilot in the Divarty Aviation Section or one of the three Brigade Aviation Sections. I don't mean to skip over the 4/7 Cavalry and their Headquarters, B, C and D Troops, but again, the likelihood of your being assigned there as a UH-1 or OH-58 pilot or maintenance officer, is reduced somewhat by your lack of AH-1 qualification.

"The 2d Infantry Division is a proud unit, Jimbo, and they have an important mission, in the forefront of the free world's defenses against communist aggression. You can be sure that any assignment there would be challenging and rewarding." MAJ Goodsell pauses, seems to brighten, and says, "Hey, I see you're taking notes! I like your attitude Jimbo. You're going to do just fine on this assignment. Is there anything you'd like to ask me about 2d Division aviation assets before I tell you about some of the other units?"

Lt Askyou flexes his numbed right hand and smiles uneasily, "Well, sir . . . not really; some of the guys in the unit have served in the 2d Division and they told me a lot about it. One of the warrants told me about an Army Security Agency (ASA) unit, he said it was the best unit in Korea."

"Jimbo," the Major speaks earnestly, his expression gradually becoming an all knowing smile, "you know what they say—your next and last assignments are always the best in the Army. The ASA unit your friend refers to is probably the 146th Aviation Company, which is part of the 501st Military Intelligence (MI) Group and works for the Intelligence and Security Command (INSCOM). Assignment to these units is controlled by INSCOM from Continental United States (CONUS). If you were being assigned there you would already know it and probably would be getting some specialized training.

"The 146th is a RU-21 company—but there is also an OV-1 unit, the 704th Military Intelligence Detachment, Aerial Surveillance and the ASA Field Station has a UH-1 section. Another unit whose assignments are controlled from CONUS is Far East District Engineers (FEDE). This small unit has two UH-1s.

"There are three other aviation units which operate more or less independent of an in-country aviation headquarters, Jimbo. The 377th Air Ambulance or Medevac Company which works for Medical Command, Korea (MEDCOM-K) and essentially supports all of U.S. Forces, Korea, by operating from three main field sites—Osan, Taegu and Tongduchon, as well as from their headquarters in Seoul.

"The U.S. Army Air Traffic Control (ATC) Battalion also is headquartered in Seoul and although they currently have no aircraft, their aviators are supported by UH-1s from neighboring units. Although the ATC Battalion is assigned to the 1st Signal Brigade, the unit is operationally controlled (OPCONed) to the Eighth Army Aviation Officer. I'll tell you more about this guy in a minute. He also commands the largest aviation unit in Korea.

"The last of the small units is the 45th Transportation Company. This aviation intermediate mainte-

Glossary

ASA	Army Security Agency
ASH	advanced scout helicopter
ATC	air traffic control
CONUS	Continental United States
FEDE	Far East District Engineers
HHC	Headquarters & Headquarters Company
IFR	instrument flight rules
INSCOM	Intelligence and Security Command
MEDCOM-K	Medical Command, Korea
MI	military intelligence
OPCONed	operationally controlled
TC	Transportation Corps
VIP	very important person

nance unit supports all aviation units in Korea, and in spite of the fact that they support AH-1s from 2d Division, you could be assigned to fill one of their maintenance officer slots.

"Take a break, Jimbo, or your notebook is going to catch fire and your fingers will cramp permanently."

Once more Lt Askyou flexes his aching fingers as he flips backward over four pages of notes in his pocket notebook. "Thank you, sir. I never realized that we had so many aviation units in Korea. Well, more honestly, I guess I just never thought about it. Since I requested assignment to Germany on my preference statement . . . I guess I've paid more attention to articles and information about aviation units there. And really sir, that's sort of what I wanted to talk to you about. Is there any way —"

"To thank me for the assignment?" interrupts MAJ Goodsell. "That's not necessary at all, Jimbo. I was just doing my job. Your time came around to move, the requirements came up for your grade and specialty in Korea, and I simply put the two requirements together. The fact that you need an assignment as a maintenance officer for specialty experience and career development is just gravy. You're a lucky guy—but you don't need to thank me.

"Wow! Time is flying," the major says glancing at his watch. "I'd better tell you about the major aviation unit in Korea. I mentioned it earlier; it's the 17th Aviation Group.

"You'll recall that I said that the 17th Aviation Group commander wears two hats, that of group commander and also the Eighth Army Aviation Officer. The Group consists of the 52d Aviation Battalion, headquartered in Seoul and the 19th Aviation Battalion at Pyongtaek. The 52d Aviation Battalion Commands the 55th Aviation Company located 12 miles south of Seoul. This is the largest and most diverse aviation company in Korea. It has C-12, U-21, UH-1 and OH-58 aircraft assigned.

"As you might imagine, their primary mission is the Eighth Army very important person (VIP) and administrative mission. Two Assault Helicopter Companies, the 117th and 128th, are stationed at Chunchon and Uijongbu, respectively. These 52d Aviation Battalion Companies only have UH-1 helicopters. The medium lift is in the 271st and 213th Advanced Scout Helicopter (ASH) Companies of the 19th Aviation Battalion at Pyongtaek.

"Also at Pyongtaek is half of a unique modified assault helicopter company with both UH-1s and OH-58s. The other half of this 19th Aviation Battalion Company, along with the company headquarters, is located in Taegu. This unit is the 201st Aviation Company, formerly the 3rd Aviation Detachment."

Here, MAJ Goodsell pushes back his chair, stands up and with an air of a satisfied workman completing a difficult but pleasant task, announces, "Well Jimbo, that pretty well does it. Those are the possibilities, and as I've said before, no matter where you are ultimately assigned, you're fortunate to have this opportunity while it exists.

"Many aviators believe that Korea offers the most realistic military flying environment available. The experience you will gain flying in mountainous terrain and the real world urgency of flying in Korea's tactical zone will be a valuable asset to you in future years. As for the off duty sights, sounds and experiences—I could mention the ancient pavillions and palaces, Confucian Shrines, Buddhist Temples, the picturesque peddlers and their impossible loads balanced on heads, shoulders, back packs or bikes. I could mention the night life in a capital city of 7.2 million people, the fantastic beauty of the inlaid lacquer furniture, folk costumes, customs and culture, up to 4,000 years old, and opportunities for nearly every conceivable hobby, sport or pleasure you might seek—but I won't—you'll find all these things out yourself. This is going to be a great tour, Jimbo, enjoy it.

"I'm sorry I took so long, Jim. I know you've got a long drive back to Ft. Bragg. By the way, drive carefully and good luck with your assignment."

Once more, the brilliant smile, the extended hand and Lt Askyou stumbles to his feet to share the handshake. He stutters weakly, "Yes, Yes s . . s . . sir. Thank you sir."

SFC Frank P. Bryson, 101st Public Affairs Detachment, Delaware Army National Guard, was not credited for the photograph at right which appeared in the August 1978 issue on page 6. The *Aviation Digest* regrets this omission

Officer Personnel Management System

OPMS CORNER

• Aviation Career Incentive Act Flying Data
• Flight Clothing and Equipment
• Current Flight Physicals
• Officer Record Brief Aviation Data Correction

LTC Jacob B. Couch Jr.
Aviation Management Branch
Officer Personnel Management Directorate
U.S. Army Military Personnel Center

Aviation Career Incentive Act Flying Data. During September 1978 Military Personnel Center (MILPERCEN) completed the initial distribution of DA Circular 600-13, "Aviation Career Incentive Act Flying Data." After distribution was completed about 400 copies remain as excess. Requests for additional copies should be sent to Commander, MILPERCEN, ATTN: DAPC-OPP-V, 200 Stovall Street, Alexandria, VA 22332. A return address label should be included with each request. Circulars will be mailed to units only; individual requests will not be honored.

Flight Clothing and Equipment. Numerous individuals continue to report to Ft. Rucker, AL for temporary duty (TDY) aviation training without bringing their individual flight clothing and equipment. Ft. Rucker does not have sufficient funds to cover the issue of equipment to TDY students. All organizations must ensure that their personnel report to Ft. Rucker with *all* authorized flight clothing and equipment. An aviator's failure to do so could delay the start of flight training.

Current Flight Physicals. The failure to pass an Aviation Career Incentive Act (ACIA) "gate" does not eliminate the requirement to maintain a current flight physical.

Officers who hold Specialty Codes 15 (Aviation), 67J (Aeromedical Evacuation Officer) and 71 (Aviation Materiel Management), except those 71s who are indefinitely suspended, *must* maintain a current Class 2 Flight Physical to retain qualification to hold an aviation related specialty.

Individuals that do not hold an aviation related specialty, but have been awarded the aeronautical designation of Army aviator also must maintain a current flight physical. These personnel are usable aviator assets that could be assigned against operational requirements even though they do not possess aviation related specialties. Failure to maintain a current physical can restrict worldwide use.

Commanders must ensure that aviators comply with the requirements of AR 40-501, "Standards of Medical Fitness." Individuals not desiring to maintain a current flight physical can be considered for appropriate action in accordance with AR 600-107, "Medical Restriction/Suspension from Flight Duty, Nonmedical Suspension, Flying Evaluation Boards, and Flight Status Review System."

Questions concerning this subject should be addressed to the Aviation Management Branch, AUTOVON 221-0727/Commercial (202) 325-0727.

Officer Record Brief (ORB) Aviation Data Correction. A recent change to the Standard Installation/Division Personnel System (SIDPERS) User Manual allows military personnel officers (MILPOs) to make corrections to certain items of aviation data on the officer master file (OMF). (The ORB is an extract of the OMF.) Other entries require MILPERCEN input for the correction. The items that must be validated by MILPERCEN are:

- ASED (Aviation Service Entry Date)
- TOFDC (Total Operational Flying Duty Credit)
- TFOS (Total Federal Officer Service)
- Pilot Status

The MILPOs have been provided form letters to facilitate the requesting of changes by MILPERCEN. This change request must be accompanied by substantiating documents. The documents include but are not limited to: Individual orders, DA Form 759 (Individual Flight Records), DA Form 2-1 (Personnel Qualification Record), etc. Individual aviators can expedite the correction of these critical ORB entries by assisting in the collection of documentation.

A Flight Surgeon Looks At Flight Surgery

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IN LOOKING AT flight surgery, the fundamental goal remains to prevent aircraft accidents by promoting the health of the flyer.

The annual physical exam plays an important role to that end and should be regarded as more than a quick once over and recording "Digital Rectal Normal." This process of ensuring that the aviator is safe to fly should be continual and therefore a year long and life long process.

It is this temporal aspect that is ignored frequently by flight surgeon and aviator alike. One other area of concern is the underlying attitude of the flight physical itself. To amplify what I think are the correct attitudes, I wish to draw the parallel of the medical examination being analagous to preflighting the flyer.

The annual physical, then, like the preflight, should be by the book and is thoroughly effective only if there is adequate two way communication between the flight surgeon and aviator. Too often this communication is lacking. To understand why communication is especially important, and why it may be lacking, it is necessary to understand the intimate relationship between the aviator and the unit flight surgeon.

The flight surgeon and the military pilot have a peculiar relationship. There is an interface formed between them which is bonded by the common interest of aviation safety and this bond should be inseparable. If the relationship is strong and cohesive, then flying safety is not only maintained but enhanced.

A similar situation exists between the pilot and the aircraft, yet that is a relationship of person to machine. However, neither the pilot nor the flight surgeon is an inanimate object, and the important difference is that they must react to each other as people whether they wish to do so or not.

This factor incurs responsibility as it becomes incumbent on both the flight surgeon and the pilot to maintain proper communication and feedback. Put simply, the bottom line is that the helicopter was never meant to be a good conversationalist whereas that thinking species of the human race, the aviator, should be.

In recent issues of the ***Aviation Digest,*** attention has been placed on accidents that were caused by a failure of preflight. Basic to this notion is the aviator's physical exam. Each year, as you all vividly recall, each aviator undergoes a flight physical. The object is to make a simple decision: is the aviator safe to fly or not?

Several problems occur here that are detrimental to communication and therefore to this decisionmaking process. First, a year is just too long a time to elapse *if that is the total contact between pilot and flight surgeon.* One month from now, 6 months from now, for whatever reason, a pilot could be unsafe, either

temporarily or permanently. Therefore, contact should be stressed as contact is the precursor to communication. Both the aviator and the doctor must be active in this regard. Put basically, they must know one another and talk to one another. Then they will grow to trust one another.

Another reason for increased communication during the period prior to the physical exam is that many times the aviator is not ready for a physical, and furthermore may be unaware of this unreadiness.

Many of you may ridicule that last sentence, but at least one-quarter of all rated aviators, in my experience, will fail the physical exam the first time they take it. These people fail, not grossly, but they fail nonetheless.

Frequently it is for the "minor things' such as being overweight, and I have heard more comments about why the weight standard should not apply in aviation than I care to hear. However, that observation is slightly out of the mainstream of my argument. The point is that both aviator and flight surgeon have a year within which to work, a year to ensure that the aviator will pass the flight physical.

Teamwork is essential and, in fact, mandatory if Uncle Sam is to get the most from his flight investment dollar. Why not get that funny looking "skin nurd" taken off before the flight physical. Why not start getting in shape and lose those extra pounds now? That way it will be easier for your team, the team which comprises your health and, by extension, aviation safety.

Just as the preflight presumes a knowledge of the working parts of the aircraft, the flight physical presumes a basic health knowledge on the part of the aviator. I expect aviators to know how to maintain their health, and I further expect them to ask if they don't know, and to ask frequently if they forget or have questions.

I know my expectations are not being met. For instance, and to put you to the test, how many of you know the three major risk factors of heart attacks? Come on, now, try and answer that last question. Don't feel badly if you did not answer with cigarette smoking, high blood pressure and high cholesterol diet.

During a recent study, only 1 percent of Chicago adults could name all three risk factors. But if you couldn't answer that question, isn't it time you interfaced with your flight surgeon? And if you reacted with, "I don't care and I'll bet that the flight surgeon writing this article is one of those fanatical runners and nonsmokers and is skinny," you would be right. But then, maybe I'm trying to tell you something. Health like safety is everyone's business, and did you know that exercise increases job productivity?

Suppose the worst happens during the annual physical, and an aviator fails the flight physical. By no means is that necessarily the end of a career. It does mean that the flight surgeon and that aviator will have to communicate more diligently, and work harder and longer together to ascertain if that aviator can be returned to status safely. Considering the alternative, it would be far better to have an effective health maintenance program.

A word of advice is needed at this juncture. If your copilot finds a "red X" condition, it does not make sense to argue that the condition does not exist, and that the flight will press on. Similarly, it does not make sense to argue with your flight surgeon that you do not have high blood pressure, and that the true and real reason the blood pressure is elevated is because the flight surgeon is simply taking the measurement incorrectly.

"Absurd," you think? But *I have been told that* by flight personnel and it is a very effective way of raising *my* blood pressure. The important message is that both aviator and flight surgeon have the responsibility to try and return the failed aviator to flight status. *Communication is of necessity!*

It also should be obvious that communication is mandatory in an accident prevention program. Too often there is a reluctance to speak of one's own problems, let alone the problems of others. This tendency is understandable—but not pardonable.

A problem that is recognized can be dealt with. That is not to say all problems can be solved to everyone's satisfaction, but they can be dealt with, which is infinitely more acceptable than an aircraft accident.

All prevention has dissipated, and all hope vanished from the human side of accident prevention if the only time that personal, emotional or purely medical problems surface is during an accident investigation board. Speak up, communicate. Certainly it is not easy, but the alternative is far worse.

This article may be more gloomy than it should be. I have not tried to imply that communication is lacking totally from Army aviation. Indeed, I have found that aviators are some of the best and most communicative people that I have ever worked with. Nevertheless, the thrust of this article calls for more communication as this is the only way the aviator and flight surgeon can share in "preflighting the pilot."

Flight surgery, then, is not the annual practice of rectal analysis, where no pilot is considered too large or small. Rather, flight surgery is the practice of aviation medicine. It is a discipline, centered upon safety in flight, with all the accompanying variables that total safety must encounter.

Say what you will about the last sentence, but say it to your flight surgeon. Then communicate what the two of you think to others.

What Is A Safety Officer?

Captain Frame J. Bowers III
Aviation Safety Officer
1st Cavalry Division
Fort Hood, TX

CONSCIENCE (kon'shens) n. faculty of judging one's own acts.

How many times have you been chewed out by your safety officer for doing something that you *knew* was incorrect?

An example could be not allowing yourself enough time to properly preflight, and consequently not using the checklist. Another possibility is the time you "forgot" to take the fuel sample because the ground was wet and the weather was cold. Or maybe you made a flight that was "only in the local area" and didn't bother to take your survival vest with radio along.

In each case, there was probably a nagging little voice in the back of your mind that warned you against doing whatever it was that made you feel guilty. But thanks to a fantastic ability to rationalize that goes with the required imagination and undeniable brilliance of those who fix or fly helicopters, you press on while ignoring that irritating yammering in the back of your mind.

Suddenly, WHAM!! — the safety officer (or the commander, or a crewchief, or a WO1 fresh out of flight school) points out your transgressions. Or worse — you get into trouble because no one caught you before your mistake caught up with you.

So what's the point? Aviation safety officers tell you nothing that you shouldn't already know. In effect, they are nothing more than a walking, talking, sometimes very irritating conscience. They would be, however, a lot less irritating if we could cut down on their workload by listening to our own, built-in conscience, instead of ignoring it until they (or someone else) catches us doing something we know is incorrect.

Then, of course, there is another added bennie: on that one occasion when we are thinking of doing something that will lead to a major disaster, the safety officer may not be around. Then, the only thing between us and that fatal mistake will be a conscience...

What kind of shape is your conscience in? Has it been exercised lately by your listening to it?

(Thanks to the 1st Cavalry Division's Aviation Safety Newsletter.)

Limited Quantity Available — Three Part Series About

AH-1S Cobra Modernization Program

The booklet is a reproduction of the three part article published in the *Digest* beginning in January 1978. It describes and details the AH-1S features which will exist in all Cobras by 1985.

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THE THREAT

Test Your Threat Awareness Quotient

MULTIPLE CHOICE

1. Which munition has the fastest velocity?
   a. The SWATTER antitank guided missile (ATGM)
   b. The 23 millimeter (mm) ZSU-23-4 gun ammunition round
   c. The SAGGER ATGM
2. The SA-2 SAM is a mobile, track-mounted, radio/homing air defense missile used in a fixed defense role. Displayed around 1956, the 2-stage solid/liquid propelled missile is capable of about 18 kilometer (km) vertical and 50 km horizontal ranges.
   a. TRUE
   b. Only partly TRUE
   c. FALSE
3. The Mi-24 HIND D helicopter is:
   a. The most heavily armed helicopter in the world
   b. A streamlined armed troop transport helicopter
   c. Neither a nor b
4. The SA-9 SAM is a vehicle-mounted, cannister-launched adaptation of the SA-7 and is found employed with the ZSU-23-4 AAA system in a composite battery. (TRUE or FALSE).
5. The SA-9 is mounted on the:
   a. BTR-152
   b. BTR-60
   c. BRDM
   d. Not vehicular-mounted, but shoulder-fired
   e. PT-76 chassis
6. The SA-8 SAM:
   a. Is mounted on a 6 × 6 amphibious launcher
   b. Features TEL (Transporter-Erector-Launcher)—mounted search, acquisition and guidance radars
   c. Features the STRAIGHT FLUSH radar-mounted on a modified ZIL-157 truck
   d. Features the STRAIGHT FLUSH radar-mounted on a modified PT-76 tank chassis
   e. Is mounted on a modified PT-76 tank chassis.

   Correct answer is:
   1. a only
   2. both a and b
   3. a and d
   4. c and e
   5. d and e
7. Which of these tanks have snorkling capabilities?
   a. T-54 b. T-55 c. T-62 d. T-64 e. T-72
   1. a, b, c
   2. c, d, e
   3. a, c, e
   4. None of the above
   5. All of the above
8. Soviet recon patrols use BTR-60PB scout vehicles and motorcycles with sidecars equipped with RPK 7.62 light machineguns (TRUE or FALSE)
9. The Soviet FRONT is:
   a. Their version of the forward edge of the battle area
   b. A Soviet Army Group
   c. A scaled-down, BMP-type combat vehicle used by Soviet airborne troops. It is both air-droppable and amphibious
   d. A general term describing large-scale maneuvers conducted in the Belorussian, Carpathian, Siberian and Transbayhal Military Districts
10. The Soviets define the meeting engagements as combat between opposing columns that are rapidly advancing toward each other. A reinforced tank battalion is most likely to be committed to a meeting engagement:
    a. During an advance-to-contact
    b. Against enemy reserves after a successful breakthrough operation
    c. In the course of either an enemy or Soviet counterattack
    d. During pursuit operations
    1. a, c, d
    2. a only
    3. a, b, d
    4. None of the above
    5. All of the above

ANSWERS

1. b
2. b. (While the SA-2 is considered transportable, it is not mobile nor track-mounted. It has often been seen being towed on a trailer by the ZIL-131, 151, 157 or SR-114 trucks or by the AT-S tracked prime mover. The remainder of the question is true.)
3. c. A variant of the Mi-8 HIP is the most heavily-armed helicopter in the world. HIND is not primarily a troop transport helicopter as is the HIP.
4. FALSE. The SA-9, although somewhat similar to the SA-7, is not a vehicular version of the shoulder-fired SAM.
5. c
6. 2 (both a and b). The STRAIGHT FLUSH Fire-Control radar, mounted on a PT-76 tank chassis, is normally associated with the SA-6 which is mounted on a variation of the ZSU-23-4 chassis.
7. 5. All can snorkle.
8. TRUE
9. b. (Answer c describes the vehicle.)
10. 5. (A Soviet tank battalion may take part in a meeting engagement either as the advance guard of a regiment or as part of the main body after contact already has been made with the enemy.)

Reporting Final

Late News From Army Aviation Activities

FROM THE PENTAGON

Black Hawk Update. The UH-60 Black Hawk program continues to move smoothly and is now in the production phase. The initial production aircraft will be sent to Ft. Campbell, KY where the 101st Airborne Division (Air Assault) will conduct extensive evaluation and testing to assess operational effectiveness, mission performance, maintainability and deployability. Designed to carry an 11-troop infantry squad, the UH-60A has the capacity to carry 14 combat loaded troops in addition to the three crewmembers in conditions of 4,000 feet altitude and 95 degree Fahrenheit temperature. It can accomplish this with a vertical rate of climb near 400 feet per minute (FPM) (600 FPM with 11 passengers), cruise speed of 145 knots true airspeed (TAS) and with a duration of 2.3 hours. The slingload capacity is 8,000 pounds. The Black Hawk will replace the UH-1 Huey in cavalry, air assault, combat support and medical evacuation roles. The excellent crashworthiness of this aircraft is shown in the following comparison of two recorded actual impact experiences:

	UH-1H	*UH-60A*
Impact Conditions		
Airspeed (knots)	50 Kts	70 to 90 Kts
Vertical rate of descent	1,140 FPM	2,500 FPM
Injuries	2 Major	None
Hardware Damage Cost	$344,912	Minimal

(ODCSOPS)

Advanced Medium STOL Transport (AMST). The AMST is an Air Force program to modernize the tactical airlift fleet and replace the aging C-130 fleet in the 1980 timeframe. The AMST Prototype program was won by Boeing and McDonnell Douglas. Each

produced and flight tested two prototype aircraft. The Boeing YC-14 is a two-engine aircraft, the McDonnell YC-15 is a four-engine aircraft; both are jet transports and feature a wide body. Although this is primarily an Air Force program the Army is the primary user. Thus the Air Force developer is working closely with the Army to satisfy our requirements. In 1957 the key firepower and essential combat elements of 16 of the 19 active divisions could be airlifted by C-130; today only 3+ of 16 active Army divisions can be lifted by C-130. The major equipment for which the Army has a tactical airlift requirement in the 1980s includes the XM-1MBT, IFV, DIVAD, 8 inch and 155 mm Howitzer, Hawk and Patriot. None of these items are transportable in the C-130. As you can see in the trend towards increased firepower and mechanized mobility, Army equipment has outgrown the C-130 cargo compartment. The AMST has a short landing capability of 2,000 feet. This characteristic provides great flexibility in that it triples the number of available airfields in the North Atlantic Treaty Organization (NATO) area as compared to a C-130. Also airfield construction and maintenance effort will be reduced. Source selection is scheduled for fiscal year 1979. If the green light is given to proceed beyond source selection, the winner's two prototypes plus three more aircraft will enter another test phase with a still later production decision for initial operational capability. **(ODCSRDA)**

Avation Life Support Equipment (ALSE). Aviation life support equipment is managed within a system that encompasses the integrated assemblage of equipment/components, techniques and training required to assure aircrews and passengers the best possible flight environment for conducting Army aviation missions. The aircraft environmental subsystem includes oxygen systems, flight uniforms, body armor, helmets and nuclear, biological and chemical protection. The aircrew escape and descent subsystem includes parachutes, ejection seats, restraint systems and canopy removal systems. The aviation survival and recovery subsystem includes survival kits, marking devices, emergency radios, survival foods and rafts. Focal point for ALSE management coordination is the Aviation Life Support Equipment Steering Council. Current ALSE initiatives taken by the U.S. Army Aviation Center (USAAVNC), Ft. Rucker, AL should result in the firm documentation of numerous hardware requirements. The possibility of an ALSE military occupational specialty (MOS) or additional skill identifier and the publication of specific ALSE guidance are being examined. Central points of contact for ALSE are Mr. A. B. C. Davis, TSARCOM, AV 698-3241; Mr. Ray Barringer, USAAVNC, AV 558-2704; LTC Bisbey, HQDA-ODCSRDA, AV 225-1362; and LTC Fairweather, HQDA-ODCSOPS, AV 227-9666.

(ODCSOPS)

Army Aviation Policy Board. The U.S. Army Aviation Policy Board (which replaces the Army Aviation Standardization Board) met in the Pentagon last November to examine the effects of existing Army policies on the ability of Army aviation to meet

its mission requirements. The board meeting was keynoted by LTG Meyer, Deputy Chief of Staff for Operations and Plans, Headquarters, Department of the Army and was attended by aviation representatives from all major commands, principal Army staff agencies, the U.S. Army Aviation Center and the U. S. Army Safety Center. Major issues addressed included aviation training, aviator cockpit performance, aircraft maintenance, aviation safety, air traffic control, aviation publications and training literature. In the area of personnel the board recommended that Military Personnel Center publish literature illustrating typical career patterns for aviation warrant officers. It was recommended that the special study group reviewing career management field (CMF) 67 review the assignment of 67N and 67Y as compatible MOSs and the feasibility of including aviation life support equipment (ALSE) specialists in CMF 67. The need for a composite toolkit was addressed in the area of logistics. Major points in the safety area were the continuation of the Centralized Accident Investigation and return of the aviation safety assistance visits by the U.S. Army Safety Center. In the training area, discussion centered on the under utilization of the synthetic flight training systems, the C-12A simulator course, and the need for a U-21 transition course. The Board recommended that planning a tactical instrument flight be required as a portion of the annual renewal. Considerable discussion took place on problems with the Aircrew Training Manuals (ATM). These problems will be addressed during a comprehensive review of data compiled during the first 6 months of operation under the ATM system. A void in doctrine for fixed wing operations in combat also was identified, as were problems associated with simulated emergency touchdown maneuvers in helicopters. The minutes of the meeting will serve as a basis to develop formal tasking, where appropriate.

(ODCSOPS)

ARCSA III Fiscal Year 79 Annual Review. The annual review of the Army aviation force structure commences at Ft. Rucker next month. Agenda topics include reorganization of the air assault division; the aviation maintenance structure; ARCSA III force structure implementation progress; roundout unit aviation assets; emerging results, implications, and impact of major studies and other efforts (ATHELO, Air/Ground Cavalry Study, Specialty 15, etc.); the status of the observation helicopter, UH-1 and CH-47 Chinook fleets; and other important subjects. The annual reviews allow the Army to regularly update aviation force structure needs; adjust to changes made in the remainder of the force structure, and to establish a base for projection of future equipment, personnel and support requirements.

(ODCSOPS)

Upgrade Of UH-1/AH-1 Low RPM Warning Box. The current low RPM warning system for the UH-1/AH-1 helicopter can activate from causes other than actual low engine or rotor RPM. Failure of either the engine or rotor tachometer generator, or a wiring failure in either circuit, will activate the warning system. Experience has proven that pilots often have difficulty in determining the cause for system activation. This factor coupled with limited reaction time can result in an aircraft accident with possible injury to both the crew and passengers. To assist the pilot in determining the correct emergency procedures, TSARCOM has taken steps to modify the internal circuitry of the warning box so that activation will only occur when either the rotor or engine tachometer circuit fails. The pilot can then check appropriate instruments to determine whether he has an actual engine or tachometer circuit failure. With the new modification the audio horn will activate only when both the engine and rotor tachometers fail or both indicate low RPM. The warning light also will illuminate to indicate high rotor RPM. To assist TSARCOM in the implementation of the upgrade program, all units will return their supply of serviceable warning boxes that are not required and unserviceable reparable boxes to Corpus Christi Army Depot (CCAD), RIC: B52, Supplement. Add: W45H08. These returnables will be upgraded and used as a pool of assets for use as exchange items for the field change-out program. The specific warning boxes to be returned to CCAD are on the Automatic Return Item List (ARIL). The NSNs are as follows:

NSN	*MFG PART NUMBER*
5340-00-179-2643	1704-1001-2 or 2390-4
6340-00-169-1598	700348
6340-00-911-9337	1704-1001-1 or 2390-2

Warning boxes of the following NSNs and P/Ns will be disposed of locally when they become unserviceable or are replaced by upgraded warning boxes:

NSN	*MFG PART NUMBER*
6340-00-911-9333	205-074-001
6340-00-911-9334	2390-1
6340-00-911-9336	38-42-00870
6340-00-299-1052	205-074-001-1

The upgraded warning boxes will be assigned a new NSN and part number. This change will facilitate quick identification of upgraded or nonupgraded boxes. Exact timeframes for this program have not been set. Establishment is contingent upon availability of all required material. Unit will be notified when the changeout is scheduled.

(ODCSLOG)

AVIATION IN Alaska is a necessity created by the vast ruggedness of the state itself. Army aviation in Alaska provides airmobility and counters problems offered by the state's limited road and rail systems as well as the effects of the harsh Arctic climate. Vigorous unit training as well as intense individual training ensures the readiness posture of aviation units, thereby assuring a year-round aviation support capability.

From island hopping in the Aluetian chain, to traversing Alaska's glaciated mountain ranges and from the jagged peaks of the Brooks Mountain Range to the isolated eastern border of the state, aviation is the primary means of transportation. Alaska's 586,000 square miles contain virtually every terrain condition found anywhere in the world.

A dense rain forest of southeastern Alaksa measured against the frozen tundra of the Arctic North Slope helps illustrate drastic differences in terrain separated by three mountain ranges and more than 1,300 miles — yet within the boundries of the same state. Regardless of terrain, the Army requires mobility on the modern battlefield; therefore, it *depends* on aviation in the Arctic.

The Army's requirement for mobility in Alaska is provided for by the Army's largest and most diverse aviation battalion — the 222d Aviation Battalion (Combat) "Skymasters." Especially tailored for the Arctic, the Skymaster battalion provides the Army's Alaskan command, the 172d Infantry Brigade (Alaska), with an ever-ready aviation capability.

Centrally located at Ft. Wainwright, adjacent to Fairbanks, are:

- The battalion headquarters
- The "Ramroads" of Headquarters and Headquarters Company with six UH-1 Hueys and four OH-58 Kiowas
- The "Sugarbears" of the 242d Aviation Company with 16 CH-47C Chinooks
- The "Polar Lifts" of the 343d Aviation Detachment with four CH-54B Tarhes.
- The "Hawks" of the 172d Military Intelligence Detachment (Aerial Surveillance) with six OV-1D Mohawks
- The most recent addition to the Skymaster Battalion, the 283d Medical Evacuation Detachment.

The "Old Dukes" of the 568th Transportation Company (Aircraft Maintenance) are stationed at Ft. Wainwright and provide the Skymasters with an organic general support maintenance capability, a necessity because of the remoteness of Alaska and the nonavailability of any other aircraft maintenance facility of a comparable echelon.

Both the "Arctic Knights" of the 120th Aviation Company with 26 Hueys and six AH-1G Cobras and the Headquarters and Headquarters Company Command Flight Platoon with two C-12A aircraft are located near Anchorage at Ft. Richardson and Elmendorf Air Force Base, respectively.

The Skymasters mission is to provide airmobility to the Arctic infantry, conduct medium range aerial surveillance and target acquisition, and provide command and staff transportation to the 172d Infantry Brigade (AK). Special missions include search and rescue operations and civilian disaster assistance which encompasses firefighting and flood evacuation in isolated river villages.

Roads exist between Alaska's two major cities, Anchorage and Fairbanks, but, with the exception of a somewhat larger network of smaller unimproved roads, most of the out-

Arctic Soldiers with combat gear exit CH-47

ATION IN THE RCTIC

CW3 Lyle M. Rizk
Fort Wainwright, AK

lying areas (commonly referred to as the "bush") are inaccessible. Alaskans cannot drive to their state capital city of Juneau because there are no connecting roads. With the exception of the town of Haines, residents of southeastern Alaska cannot drive to any other part of the state. Residents of Haines may travel by gravel road to other parts of the state provided Canada maintains the road between Alaska's borders. This limited road situation does not enhance the Army's mobility requirement.

Alaska's dependable railroad can move large numbers of people and plenty of equipment, but here again, the railroad parallels one of the roads between Anchorage and Fairbanks limiting its tactical use. These considerations, coupled with the Arctic winter and summer climatic conditions, pose serious problems which must be overcome with aviation support.

During Arctic winters, temperatures frequently reach minus 60 degrees Fahrenheit during 22 hours of darkness. This probably is the most formidable obstacle to successful Arctic operations. When deployed during the winter, ground units depend on aviation for life sustaining supplies and creature comfort items. At minus 60 degrees Fahrenheit, exposed flesh will freeze in 2 minutes; protection against the unforgiving cold is an obvious priority.

Deep powder snow restricts ground movement of troops and equipment to that required for defense. The reader can probably imagine trying to move even a squad of Soldiers dressed in up to six layers of Arctic clothing, with weapon, protective mask, web equipment and rucksack, through 4 feet of powder snow while pulling an Arctic ahkio (sled). Indeed Arctic Soldiers depend heavily on Army aviation.

Arctic summers, with temperatures ranging from 65 to 90 degrees Fahrenheit during 22 hours of daylight, can be pleasant and would seem to alleviate the mobility problems encountered in the winter. Not so! The powder snow is replaced by the swampy sponge-like muskeg scattered among the more solid tundra of the Arctic. The infamous Alaska mosquito appears during the summer and immediately replaces the biting cold of the winter. They get fat on repellent and cause confusion when they are sometimes mistaken for enemy fighters.

All in all the Arctic climate, summer and winter, offers challenging problems that are overcome with intense training and aviation support.

In maintaining the state of readiness necessary for year-round defense of the Arctic, the Skymasters frequently participate in field training exercises (FTXs) designed to obtain a level of proficiency commensurate with the requirements of the Arctic environment. The combining of the Army Test and Evaluation Program (ARTEP) requirements with quarterly FTXs makes training realistic.

During fiscal year 1978 the Skymasters flew in excess of 4,000 hours

Arctic Soldiers must contend not only with potential enemy forces but severe winter cold as well. Note the frost that has formed on the moustache

in support of FTXs at locations as remote as King Salmon, in southwestern Alaska on the edge of the Bering Sea, to the jagged Alaska Mountain Range near Big Delta. Mountain training receives much emphasis as each exercise, indeed, each mission involves mountainous terrain to some extent. Operations on Alaska's glaciers are high-risk missions requiring total teamwork, crew coordination and, additionally, an extremely high degree of pilot proficiency.

Alaska's glaciers enable the Arctic Soldier to maintain year-round proficiency in Arctic operations. Without aviation support, this capability would be lost. Army aviation training involves more than FTXs. Routine missions and missions requiring specialized training provide Skymaster personnel with the experience to conduct aviation support operations over any type terrain in any weather condition.

Routine missions range from evacuating villages inundated by spring floods to searching for missing personnel or aircraft, civilian as well as military. Frequently, civilians and governmental agencies request and receive aviation assistance for a myriad of missions.

A Soldier fills can with fuel to be used in Yukon or pot-bellied stove — equipment necessary for survival during long Alaskan winters

A forward area refueling and rearming point in the Alaskan wilds

The communication link between the civilian community and the Skymasters is the Rescue Coordination Center (RCC) at Elmendorf Air Force Base. The RCC called on the Skymasters more than 50 times in 1977 to perform emergency missions. Each involved personnel in need of assistance and, in some cases, lives hinged on reaction time as well as the experience of Skymaster personnel.

As an illustration, one emergency mission requiring specialized training is high-altitude rescue. A team of specially trained personnel, membes of the 242d Aviation Company Sugarbears with specially equipped aircraft, maintain a constant state of readiness during the summer mountainclimbing season. While performing this dangerous and sometimes daring mission, this team has saved many lives. In July 1977 several severely frost-bitten Japanese climbers were plucked from the icy grasp of Mount McKinley's 17,000 foot level.

An oxygen system designed by Skymaster personnel enables the high-altitude team to operate at heights exceeding 20,000 feet. Two specially prepared CH-47C Chinooks have Army approval to fly up to 18,000 feet. This mission and other emergency missions require many hours of specialized training; however, emphasis remains on individual training in the Arctic.

All Skymaster personnel receive cold-weather indoctrination. Organic pathfinders supervise a bivouac lasting 3 days and 2 nights to acquaint all newly assigned personnel with the effects of cold weather and other adversities affecting cold weather operations. Additionally, flight crewmembers must attend the Air Force Cold Weather Survival School near Fairbanks as soon as possible during the winter months. The 1-week school is highly regarded by tenured "sourdoughs" as a lifesaving course.

During the summer months Skymasters participate in Dynamic Arctic Training (DAT) exercises. Personnel fly to remote wilderness areas where they must survive for 3 days and 2 nights with the minimum equipment normally found aboard their aircraft. Since survival rations aboard the aircraft cannot be used on training exercises, each Soldier is given one C-ration meal package for each day of the exercise. Fishing or trapping small game provides supplemental food.

Through the various training situations encountered in Alaska, many problem areas surface and most are

peculiar to extreme cold weather operations. To illustrate, lubricants for aircraft as well as vehicles and numerous pieces of heating and power equipment thicken in extreme cold temperatures. At minus 30 degrees or below, oil is not frozen, but it is so thick it will not pour from the container.

The tentage for sleeping quarters or shop space poses additional problems. During extremely cold weather the ground is frozen: trying to drive tent pegs proves frustrating. The task, even with the specially designed Arctic tent peg is troublesome and time consuming. Once the peg is driven, it may just pop right out of the slippery ice and leave a perfect peg-shaped hole. But Arctic Soldiers have learned that a little water around the peg will, almost instantly, freeze it solid to the hole and prevent further problems. Unfortunately, this process prevents reuse until the next thaw, so we also have learned to bring extra tent pegs.

Army aviators are renowned for their ability to estimate accurately the end of winter and the coming of spring because of the Arctic tent peg. Seen from the air, the orange pegs stand out like a sore thumb. As the winter progresses, the inventory of tent pegs increases in common bivouac areas and decreases in unit supply rooms.

Aircraft batteries require protection from extreme cold and aircraft are preheated prior to starting to ensure seals are flexible and components prepared. Mechanics working on aircraft must have a thorough knowledge of cold weather maintenance procedures. During extreme cold periods care is taken when performing even the seemingly simple task of torquing a particular nut or fitting. Different metals and metal compositions expand and contract at different rates causing some problems. For example, a preshaped and stressed steel hydraulic line may be attached with a brass fitting. These two metals contract at different rates when subjected to extreme cold and cracking or total breaking could occur.

Bundled against the cold, Arctic Soldiers wait to be airlifted from Alaskan wilderness following a rugged training exercise

Blowing snow in and around landing and pickup points coupled with the already white background of snow covered terrain causes a "white-out" condition which constantly tests the skill of every crewmember. Throw in a little ice fog — a result of extreme cold temperatures causing sublimation in the vicinity of builtup areas — and visibility drops to near zero. Even the most "routine" mission requires extensive flight planning as navigational aids are few and far between. The total darkness of the winter season adds to the navigation problem. Additionally, problems such as survival considerations, aircraft performance characteristics and the lack of available fuel add emphasis to prior planning.

The Soldiers of the 222d Skymaster Battalion have proven they can overcome the rugged Arctic environment. Through intensive training and an espirit de corps equal to any unit, they guarantee the success of the U.S. Army mission in Alaska.

Editor's Note: CW3 Lyle M. Rizk returned from Alaska in June 1978 where he served for 5 years with the 222d Aviation Battalion. He recently completed the Warrant Officer Senior Course, Class 78-2, at the Warrant Officer Career College, Ft. Rucker, AL and has been assigned to Ft. Wainwright, AK.

Heater exhaust of Arctic equipped CH-47 Chinook condenses in subfreezing air, underscoring the severity of bitter Alaskan winters

Wire Strike Prevention

CW4 Gary D. Martin
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PREVENTING WIRE strikes is everyone's business. This article makes this point by:

- Emphasizing to each aviation and ground commander, flight operations officer, aviator and crewchief that they share wire strike avoidance responsibilities.
- Listing and reemphasizing basic wire strike prevention (WSP) criteria. This criteria can be used at prevention meetings to increase WSP awareness.

The Final Authority: Whether or not wires are knocked down or remain in place depends largely (but not solely) on the final authority. That is, the operator who controls the helicopter. What is the difference between a scout (OH-58) or Cobra (AH-1) pilot who has accomplished all assigned missions and has never experienced a wire strike, as opposed to one who has experienced an inadvertent wire strike? (It should be noted that aviators who experience wire strikes usually do so only once in their career. The reason they only hit wires once is threefold: (1) They are dead; (2) they are crippled or incapacitated to the extent they no longer are on flight status; or (3) the strike made such a tremendous impression on them that their wire strike awareness level is sky high and, subsequent to the mishap, they do things right. One does not have to experience a wire strike *to do things right.* Now, back to the question I posed.)

First, aviators who have been flying nap-of-the-earth (NOE) since its conception and have never hit a wire probably do things right. That is, they perform the function of NOE at deliberate speed that is adjusted for conditions; have preplanned their route of flight; have an updated and posted wire hazard map on which they or their copilots are following; stop when disoriented and return to a known point (if necessary) when disoriented; have assigned specific duties to every crewmember and secures clearing approval before hovering sideward or rearward (probably very seldom ever hovers rearward or sideward during NOE); is thoroughly aware of the principles of NOE flight outlined in FM 1-1; and has great respect for the resultant effect which occurs when helicopters and wires meet (awareness).

Conversely and second, the aviators who have hit a wire/wires probably will never hit another. Review of accident reports reveals the existence of several common factors when a wire strike occurs. They are:

- Aircraft was being operated too fast for conditions (i.e., rain, adverse sun conditions, etc.). As driving automobiles without lights at excessive speeds at night, helicopter pilots cannot possibly see *all* wires, poles, dead limbs, etc., at excessive NOE speeds.
- Aircraft crew was disoriented temporarily at the time of the strike.
- Crewmembers did not receive an appropriate briefing from the operations officer regarding hazards in the area.
- Crewmembers did not carry an updated wire hazard map in the cockpit.
- The aircraft operator was preoccupied with personal problems on the flight which the wire strike occurred.
- Cockpit coordination and teamwork was nonexistent.
- Command emphasis on wire strike prevention was lacking as evidenced by the lack of an effective flight standardization, training and safety program.
- Commander failed to emphasize or follow up on written/oral orders to ensure consistent and correct flight operations procedures (preflight and flight) were being used.
- Commanders failed to enforce, and in some cases establish, meaningful/effective crewrest policies.

It can be noted readily from the description of the things that went wrong when wires were hit, that the aviator operator did not really have control over some of the contributing factors that led to hitting the wires.

Team Concept For Wire Strike Prevention: The wire strike avoidance objective cannot be accomplished merely by stating problems and solutions from the command headquarters. Wire strike prevention also must be emphasized at

unit level through the use of effective command supervision, preflight planning, flight procedures and intercockpit communications.

A unit aviator is not solely to blame for striking a wire with a helicopter. We all (commanders, safety and operations officers, unit instructor pilots, crewchiefs and copilots) have a job to do in wire strike avoidance and, therefore, share responsibility for wire strikes. A summary of key personnel involved and their basic functions is as follows:

The commander must exercise the proper level of supervision to ensure that assigned aviators consistently follow sound wire strike avoidance principles (figure 1). Commanders must ensure that continual emphasis on correct procedures are reinforced at all aviation safety meetings and in written standing operating procedures (SOP) and oral orders. Commanders must *formulate* and *enforce* the unit crewrest policy. The commander's key personnel in carrying out an effective wire avoidance program are instructor pilots, operations and safety officers.

The operations officer must schedule aircrews who are compatible and who have attained the desired state of training as weighed against the complexity of the mission. In addition, operations officers must provide appropriate tools (maps, briefings, debriefings) for aviators to use.

The unit aviation safety officer (ASO) provides a wire *avoidance* climate in the unit by promoting prevention awareness in safety meetings; being the commander's "quality control checker" concerning flight operations scheduling, quality briefings/debriefings, use, posting and general availability of wire hazard maps; and, in the absence of a flight surgeon, the psychological/physiological states of unit aviators.

Unit instructor pilots must practice and advocate the wire strike prevention criteria outlined in FM 1-1 and common sense rules for detecting wires in the NOE environment. Emphasis must be placed on slowing down when poor visibility conditions (into sun, rain, etc.) are encountered and stopping to reorient when disorientated.

Copilots and crewchiefs must be assigned cockpit tasks and specific

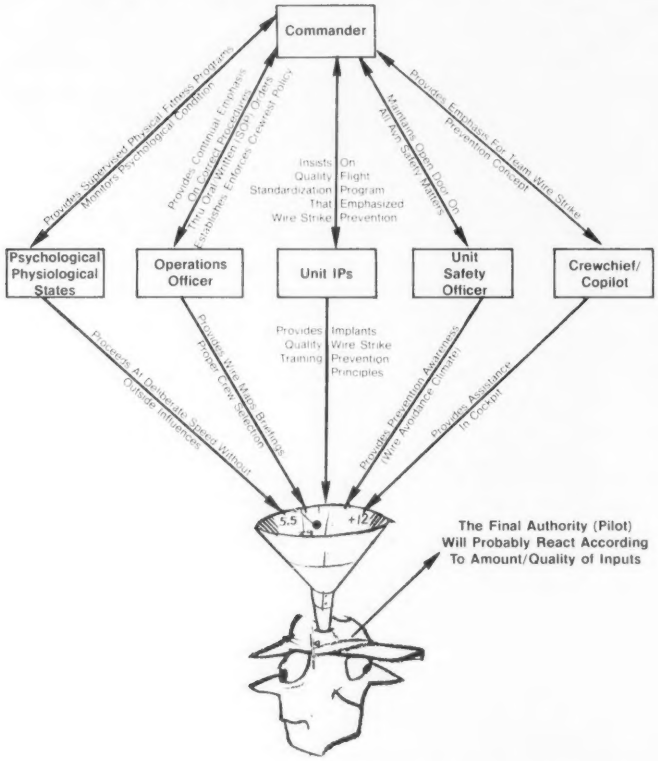
Figure 1

Extracts From FM 1-1

- "**Presently, the only means of coping with wires when conducting terrain flight is to avoid them. This requires map and aerial photo reconnaissance, maintaining an accurate hazards map, and understanding the relationship between airspeed, wire detection and avoidance. Because wires themselves often cannot be seen until it is too late, the aviator must learn to identify the visual cues to wire locations — look for the swath through the vegetation on aerial photos, spot poles during scanning, and expect wires along roads, near towers, and in the vicinity of buildings. Slower airspeeds in unreconnoitered areas must be emphasized to avoid wire strikes.**"
- "**The development and maintenance of an accurate and complete hazards identification map by each aviation unit covering those areas in which it operates and trains is essential for aviation safety. Maintaining the hazards map should be the responsibility of a specified individual in the unit. The map should depict all established routes and the hazards encountered along those routes. When the hazard is a linear (wire) rather than spot feature, the entire route of the hazard through the area should be marked. Each aviator will mark all hazards which affect his route or routes on the map that he will use in the aircraft.**"
- "**When terrain flying, the most important factor in hazard avoidance is for the pilot to keep 'his head out of the cockpit.' He must use the proper visual scanning technique (discussed in paragraph 1-8), interpret visual cues, and recognize blind spots from which other aircraft might be approaching (or setting up an ambush).**"
- "**The most common signs of fatigue are deterioration of aviator performance and judgment causing poor coordination, daydreaming, object fixation, and slowed reaction time. One of the ways to minimize fatigue in both training and combat-environment include establishing flight time limitations and crewrest periods.**"
- "**During flight the most important considerations are to maintain visual reference with the ground and to maintain a slow enough airspeed to stop in time to avoid hitting an obstacle. Also, when flying along a road, altitude must be high enough to clear wires which even in only slightly limited visibility are almost impossible to see. If the crew suspects that they have strayed from the desired route, they should stop until their exact location is determined or return to the last known checkpoint and try again.**"
- "**Weather also can be a hazard if proper precautions are not taken. Any time visibility is reduced because of flight into the sun or adverse atmospheric conditions (haze, drizzle, fog, rain or snow),** *altitude must be increased and/or airspeed decreased* **to provide the aviator added reaction time to avoid obstacles. Flight into the sun is particularly tricky — planning should avoid flights into the sun whenever possible. This is extremely important when contour flying because of the aircraft's high airspeeds and close obstacle clearance. In a combat situation, it will not always be possible to increase altitude because of enemy air defenses; so in this case,** *airspeed would have to be reduced.*"
- "**To minimize the danger of wire strikes, each aviator should make a detailed map study prior to each flight specifically to identify and mark wire hazards. After each flight, unmarked wires should be plotted on a hazards map (the hazards map is discussed later). When communication wire is laid by aircraft, the route should be plotted on the hazard map. Areas in which large numbers of TOW [tube-launched, optically-tracked, wire-guided] missiles have been fired from aircraft and in which the wires may be resting in the tops of trees should be identified.**"
- "**Helmet visors must be clean and free of scratches (page 20, FM 1-1).**" **Crewchiefs must ensure aircraft chin bubbles are absolutely clean prior to terrain flight. (Aviators must not accept aircraft for NOE flight that has a dirty windshield.)**
- "**The aviator will employ such altitude and airspeed as best enhances safety and his mission.**"
- "**Terrain flying is a crew activity conducted by at least two qualified aviators or an aviator and a qualified aeroscout observer. Terrain flight can only be performed successfully with** *teamwork.*"

Figure 2

Wire Strike Prevention — A Team Effort


Commander
Provides Supervised Physical Fitness Programs
Monitors Psychological Condition
Provides Command Emphasis On Correct Procedures
Trains Unit Within SOP Orders
Establishes/Enforces Crewrest Policy
Insists On Quality Flight Standardization Program That Emphasized Wire Strike Prevention
Maintains Open Door On Air Force Safety Matters
Provides Emphasis For Team Wire Strike Prevention Concept
Psychological Physiological States
Operations Officer
Unit IPs
Unit Safety Officer
Crewchief/ Copilot
Provides Quality Training
Implants Wire Strike Prevention Principles
Provides Assistance In Cockpit
Provides Prevention Awareness (Wire Avoidance Climate)
Provides Well Made Briefings Proper Crew Selection
Prevents Ac Damage/Injury Stopped Without Outside Influences
5.5
+12
The Final Authority (Pilot) Will Probably React According To Amount/Quality of Inputs

duties. Open lines of communications must exist between the operator (pilot at the controls) and those navigating and/or clearing the aircraft in all quadrants. ("Wires (level, low, high) at (o'clock position)" should be used by aircrewmembers in the interest of brevity.)

The aviator as the "final authority" must consistently and successfully combat the temptation to take shortcuts that may lead to a wire strike. Every U.S. Army helicopter pilot who flies in the wire environment (that's about everyone) must remain conscious of basic wire strike prevention measures that are incorporated into FM 1-1.

What We Can Do: As Mr. Ted Kontos stated in an article entitled, "Wires . . . New Threat To Safety," ***Aviation Digest,*** December 1974, we can take numerous steps to prevent wire strikes. The following were/are recommended:

- Review unit SOPs and directives relative to low level flying to make certain they reflect the safest procedures possible for the types of missions being flown. The U.S. Army Safety Center, formerly USAAAVS, studies reveal that pilots in units with strong command supervision to enforce SOPs dealing with flight discipline are less likely to become involved in wire strike mishaps.
- Provide adequate supervision to ensure pilots adhere to established policies.
- Limit the minimum altitude for required low level flight training (outside the formal NOE program) over prescribed flight courses known to be free of wires.
- When low level flights are required, provide aviators with current maps that show wire obstacles, and make certain crews receive thorough briefings.
- Unless required by missions, avoid low level flying over areas known to contain wires.
- Use all crewmembers in searching for wire obstructions during all low level flights, and ensure maximum coordination between them.
- Keep in mind, the closer to the ground the NOE contour or low level flight must be conducted, the slower the airspeed should be.

Figure 2 summarizes through illustration wire strike prevention elements and their function in providing the proper impact/assistance to the aviator.

U.S. ARMY

AVIATION STANDARDIZATION

Directorate of Evaluation/Standardization

REPORT TO THE FIELD

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362, or call us at AUTOVON 558-3617 or commercial 205—255-3617. After duty hours call AUTOVON 558-6487 or commercial 205—255-6487 and leave a message.

The Instructor Pilot: *Good Ol' Buddy or* Professional

HOW YOU PERCEIVE yourself as an instructor pilot (IP) may not be the way others see you. Most of us consider ourselves capable of meeting our responsibilities and have the confidence and ability to meet any contingency that might arise in the performance of our duties.

There are a few of our breed who claim additional attributes such as being suave, debonair, articulate and definitely a cut above the average Army aviator. You've met the type, they always stick out in a crowd. Their Nomex is always new looking and freshly pressed, while the rest of the crowd looks rag-tag, rumpled and wrinkled. There's a suspicious quality in the fit that makes one believe that their flight suits have been form-fitted while everyone else appears to have been suited up by Omar-the-tentmaker. Military appearance is not necessarily the sole criterian for evaluating the unit IPs. True, at least initially, a well-dressed individual with brightly polished boots creates a more positive attitude than one whose Nomex is rumpled and boots are scuffed. Don't be fooled! The creases and polished boots, while commendable, may not tell the full story.

We must look beyond the surface glitter and smudges to find the real professional. For example, when did you last keep a shoe shine intact while conducting a thorough preflight? The instructor pilots will not look upon their positions as status symbols. They have the confidence and ability mentioned earlier and can be counted on to deliver on schedule. They can do so because they have a positive outlook toward their job.

They know what kind of performance is expected, what their limitations are, and have set limits to maneuvers beyond which they will not allow the aviator undergoing training to deviate. These professionals will tolerate aviator shortcomings and allow continuation of a procedure to a predetermined level, but will not permit further degradation of the maneuver. They know that continuation under such circumstances greatly increases the accident potential, that the situation is embarrassing to the aviator undergoing training, and that the learning process has been adversely affected.

The responsibilities of the IPs are too great to allow deviations from established procedures, standards or shortcuts. Some of the following situations are typical of a nonprofessional attitude toward instructional duties:

- Not having the aviators fill out Takeoff and Landing Data (TOLD) cards because "we will stay in the local area."
- Not knowing the conditions, standards and description of tasks outlined in their aircraft aircrew training manuals (ATMs).
- Telling how bad the ATM is because they don't like it.
- Permitting an aviator to pass a checkride when the aviator's performance was below the standards described in the ATM.

There are, of course, many other nonprofessional stunts that are performed daily in the aviation community. If you are one of the instructors involved in such observations, then the time is right for some serious self-evaluation and corrective action.

The professional instructors' paramount interest should be imparting knowledge to their units' aviators. Of equal importance to the teaching/learning process is the instructors' outlook toward the performance of the aviators and thorough evaluation of that performance. This is where we separate the "professional" from the "good ol' buddy."

The professional instructor pilots are like Flip Wilson's Geraldine, "What you see is what you get." If they see an unsatisfactory performance, they declare it to be unsatisfactory without equivocation. They should not pass the aviators hoping that the aviators will improve in the future. The periodic checkride is not the time to discover that the aviators cannot perform as expected. Furthermore, the aviators are entitled to know how they are performing.

The instructors' analysis of the aviators' work, followed by an honest and constructive critique will do much to keep them informed. This timely feedback enhances the learning process. The "good ol' buddy" syndrome must be made to disappear from the instructor pilots' ranks if we are to maintain Army aviators' proficiency at a high level, and expect them to perform effectively and safely "Above the Best."

U.S. ARMY SAFETY CENTER

AIRS UNDER DEVELOPMENT

NO AVIATOR IN his right mind deliberately crashes an aircraft, but accidents do happen. And when they do, comprehensive investigations are launched to determine the causes. These causes were virtually impossible to pinpoint in about 7 percent of past accidents because all occupants were killed and impact forces or postcrash fires prevented a thorough analysis of the wreckage. Although there may have been eyewitnesses to an accident, it is not uncommon to get conflicting reports of what happened. There are several reasons for this. In the first place, people observe things from a different perspective. Also, the power of recall is not reliable, especially when a catastrophe occurs. Events sometimes happen so rapidly that they don't register on the observer's mind in the proper sequence. So we end up with unknown or suspected causes which are of little value in determining corrective actions to prevent similar mishaps. This is why we need a recoverable, crash-survivable aircraft recorder capable of recording in-flight and impact data for use during all investigations.

The demand for an in-flight recorder also has become imperative because of the increased complexity, high performance and cost of today's Army aircraft. In fact, aircraft electrical systems are becoming so sophisticated that it is not always possible to determine whether or not an electrical malfunction occurred.

The Army, together with industry, is currently developing a small, lightweight, low-cost Accident Information Retrieval System (AIRS) to meet this need. The complete system consists of an on-board system weighing less than 10 pounds and occupying less than 200 cubic inches of space, a portable ground system, and an existing ground-based centralized computer, as shown in figure 1.

The on-board system consists of a solid-state digital data storage unit and instruments located throughout the aircraft. This system would record pertinent flight and crash parameters as shown in table 1 which were selected based on the required features and design goals of the Army. This digital system would not store continuous flight data but would monitor the parameters and store data only if it had changed significantly from the last recorded data.

The portable ground system is a small unit that can be plugged into the on-board system to retrieve, reformat and record the data on tape for use by acci-

dent investigation boards. This data would then be directly transferred to the ground-based centralized computer either by tape or telephone.

Upon receiving the data, the central computer would analyze and reconstruct the data in a usable format to be used solely for accident prevention purposes.

The Army is also pushing the development of a cockpit voice recorder to record cockpit and radio communications. Such information would be extremely vital in investigating and reducing human-error-type accidents. Not only would it recreate the situation in the cockpit but it would also give clues as to the emotional states of the pilots during the emergency.

Several benefits can be derived from AIRS. First, it would help identify human- as well as materiel-related causes and would lead to more timely corrective actions. Second, it would aid in establishing impact conditions. Presently, velocities, angles and forces are estimated by investigation boards based on witness statements and physical evidence such as aircraft damage, terrain conditions and impact angles. Because of inaccuracies in this method, the on-board recorder would provide the impact data which would be used to properly analyze impact conditions against which crashworthiness improvements must be designed and evaluated for existing and future aircraft. Lastly, it would reduce the time and cost of investigating all mishaps.

The AIRS data would also interface with advanced flight simulators to analyze the causes of human-error accidents. Once the data is retrieved from the accident tape, a computer program can be written and programmed into the simulator to produce the same emergency situation. By flying the same flight profile, it can be determined what the pilot's actions were, if it was within the pilot's capability to cope with the emergency based on his past or present training, and if existing emergency procedures are appropriate to cope with the particular emergency. This hard-core information can then be used to enhance pilot training, to develop new training procedures, or to revise existing emergency procedures, whichever is applicable.

Because of the overwhelming advantages this system has to offer, the overall goal of the Army is to install the on-board system on initial production models of all advanced aircraft and to retrofit the existing fleet with a partial system.

TABLE 1—Pertinent Parameter List (Listed in Order of Desirability)

1. *Time*
2. *Velocity and load indications*
   - Airspeed
   - Vertical acceleration
   - Longitudinal acceleration
   - Lateral acceleration
3. *Overall aircraft condition and cockpit voice recorder*
   - Altitude
   - Heading
   - Pitch attitude and rates
   - Roll attitude and rates
   - Yaw attitude and rates
   - Rotor rpm
   - Engine rpm
   - Crew communications (cockpit)
4. *Control position*
   - Cyclic position
   - Collective position
   - Tail rotor control position
   - Vibration
5. *Failure indication*
   - Engine temperatures
   - Hydraulic system pressure
   - Chip detector warnings
   - Fire detection warnings
6. *Miscellaneous*
   - Engine torque

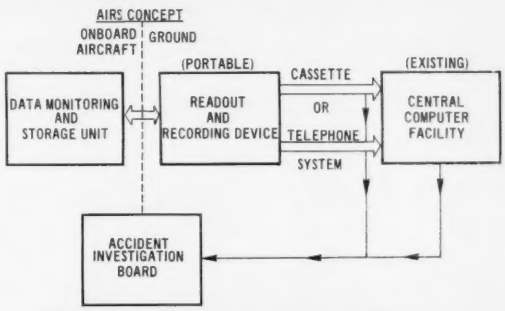
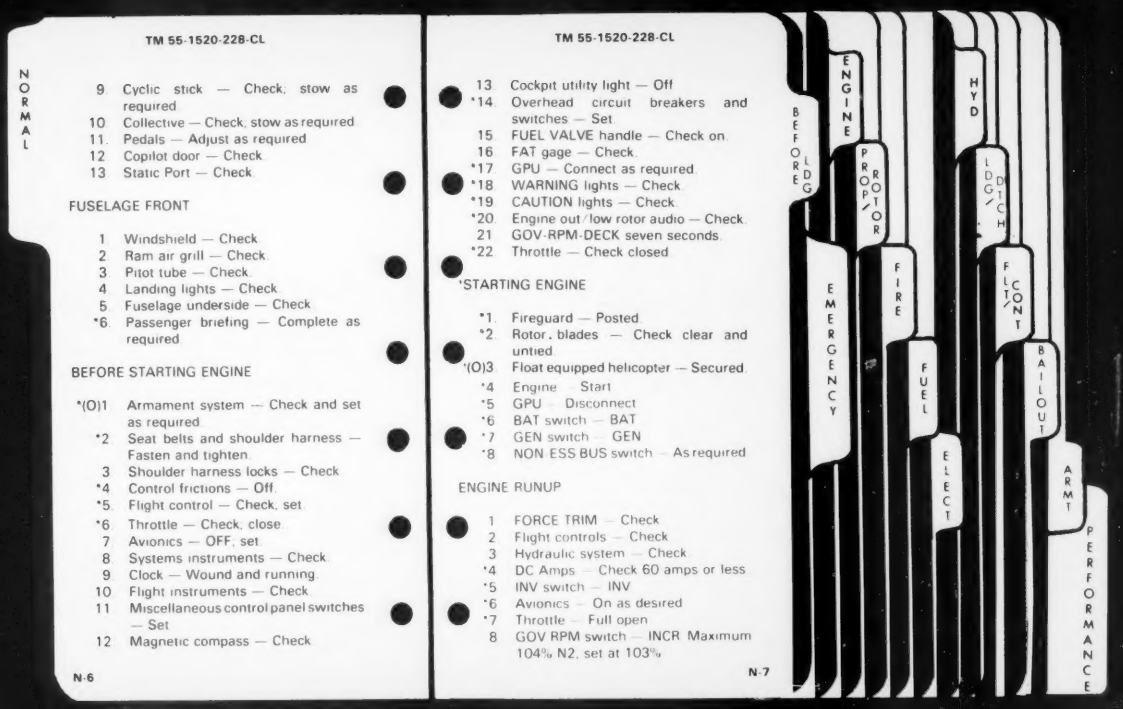


FIGURE 1.—Army Concept for AIRS System


TM 55-1520-228-CL
NORMAL
9. Cyclic stick — Check; stow as required.
10. Collective — Check; stow as required.
11. Pedals — Adjust as required.
12. Copilot door — Check.
13. Static Port — Check.
FUSELAGE FRONT
1. Windshield — Check.
2. Ram air grill — Check.
3. Pitot tube — Check.
4. Landing lights — Check.
5. Fuselage underside — Check.
*6. Passenger briefing — Complete as required.
BEFORE STARTING ENGINE
*(O)1. Armament system — Check and set as required.
*2. Seat belts and shoulder harness — Fasten and tighten.
3. Shoulder harness locks — Check.
*4. Control frictions — Off.
*5. Flight control — Check, set.
*6. Throttle — Check; close.
7. Avionics — OFF; set.
8. Systems instruments — Check.
9. Clock — Wound and running.
10. Flight instruments — Check.
11. Miscellaneous control panel switches — Set.
12. Magnetic compass — Check.
N-6
TM 55-1520-228-CL
13. Cockpit utility light — Off.
*14. Overhead circuit breakers and switches — Set.
15. FUEL VALVE handle — Check on.
16. FAT gage — Check.
*17. GPU — Connect as required.
*18. WARNING lights — Check.
*19. CAUTION lights — Check.
*20. Engine out/low rotor audio — Check.
21. GOV-RPM-DECK seven seconds.
*22. Throttle — Check closed.
*STARTING ENGINE
*1. Fireguard — Posted.
*2. Rotor blades — Check clear and untied.
*(O)3. Float equipped helicopter — Secured.
*4. Engine — Start.
*5. GPU — Disconnect.
*6. BAT switch — BAT.
*7. GEN switch — GEN.
*8. NON ESS BUS switch — As required.
ENGINE RUNUP
1. FORCE TRIM — Check.
2. Flight controls — Check.
3. Hydraulic system — Check.
*4. DC Amps — Check 60 amps or less.
*5. INV switch — INV.
*6. Avionics — On as desired.
*7. Throttle — Full open.
8. GOV RPM switch — INCR. Maximum 104% N2, set at 103%.
N-7
BEFORE LDG
EMERGENCY
ENGINE PROP/ROTOR
FIRE
FUEL
ELECT
HYD LDG/FLT CONT
DITCH
BAILOUT
ARMT
PERFORMANCE

NEW CHECKLIST AND BINDER

FOR MANY YEARS Army aviators have been using a standard size checklist (4-1/8" by 6-5/8") contained in a TM 1500-1 plastic binder and have found some undesirable features. Some of the objections to current checklists are:

- Binder rings become off-set and make page turning difficult.
- The binder is difficult to keep open at the desired spot during flight and is not compatible with issued pilot knee-boards.
- Checklist pages slip out of the plastic inserts.
- It virtually is impossible to find a spot in some aircraft to store the checklist. Once stored, the checklist is difficult to retrieve for before-landing checks and inflight emergencies.

U.S. Army Troop Support and Aviation Materiel Readiness Command has responded to the desires of Army aviators by providing a new checklist and binder. TM 1500-2 (figure 1) is made of card stock with plasticized tabs and is held together with three or more metal rings. The 4 1/2" by 8" checklist is also on cardstock with holes that correspond to the TM 1500-2.

The increased length provides for more checklist items per page, folds easily to the desired page, and fits on a standard Army kneeboard. It also is much easier to store and retrieve than the current model.

As aircraft checklists are revised, they will appear in the new size. It will take time to convert all checklists, so don't abuse your TM 1500-1 binders or discard current checklists.

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, DARCOM, ATTN: DRCPO-ALSE, POB 209, St. Louis, MO 63166

Gourmet It's Not

We have received several letters regarding the food in survival kits. Some aircrewmembers tried the food and considered it bad or unfit for consumption.

The food packets should be disposed of after 5 years; however, the life can be extended on an annual basis by your post veterinarian. Take a lot sample to the vet after 5 years. If the vet approves the sample, the entire lot may be extended for 1 year.

One thing that we do recommend is to gather all your aircrewmembers around you, break open a food packet and let everyone sample it and become familiar with the taste. Try to impress upon your group that the food was not designed to be good, but designed for high energy to sustain you in a survival environment. I have tried it myself, and gourmet it's not.

Three Years Old

Three years is not really a long period of time, but for a BA-1568/U battery, NSN 6135-00-838-0706, which is used to operate the AN/PRC-90 survival radio, that's retirement age.

We recommend that you check this battery for the survival radio before every flight. A new battery can suddenly lose its operating potential. But we realize this may not always be possible. However, you should discard the battery 3 years from date of manufacture even though it may test good.

Unhappy New Ear

If you have requisitioned new ear pads (NSN 8415-00-143-8577), manufactured under contract DSA 100-76-C-0632 for the SPH-4 flight helmet, you are sure to be unhappy.

The ear pads produced under this contract are too small and will not fit the ear pad assembly of the SPH-4 flight helmet. We recommend that you submit an SF 364 (Report of Item Discrepancy). Your unit will then receive credit for the defective item.

It's In The Bag

The water bag, 5 quart (NSN 8465-00-485-3034) has been found to have an oily substance in it. This is not normal. The bag may have a slight coating of powder, to help ensure that it does not stick together during long periods of storage.

During the next inspection of your survival kit, look inside the bag to ensure that it is not stuck together and contains no oily substance. If oil is observed, remove the bag from the kit and submit a quality deficiency report (SF 368). We would appreciate it if you would include a water bag as an exhibit.

Breakout

For you AH-1 Cobra drivers, there is a linear explosive substance (LES) to remove the canopy of your aircraft in an emergency. At one time this job was done manually with a breakout tool. However, once the LES was installed the breakout tool was removed from the aircraft.

We recommend that the tool NSN 1680-00-083-7011, or the tool with the tool mounting bracked NSN 1680-00-167-8373 be reinstalled in the aircraft. These items can be requisitioned from B17. The tool will assist you to breakout in the event that the LES does not remove the canopy.

You Won't Believe It

We have experienced a number of problems with AN/PRC-90 survival radios. However, it is still one of your most important links to being rescued in an emergency.

There still is an acute shortage even though we are receiving these radios from current contracts. You won't believe it, but I was informed that at least one organization has turned in their defective radios to the property disposal officer (PDO) for disposal. Please —there is a procedure set up to have defective radios repaired and returned to service.

Ship your defective AN/PRC-90 radio to Commander, Sacramento Army Depot, ATTN: Transportation Officer, Sacramento, CA 95801. Mark for depot stock condition code F.

You will not receive the same radio back; therefore, you must now resubmit a requisition to B16 for replacement radios. Indicate on your requisition form that you are ordering replacement radios, rather than initial issue. This will get you higher on the priority list for replacement radios.

It's The Style

When you requisition Nomex trousers, NSN 8415-00-935-4878 (series), you may get either a pair of trousers with an open pants leg with a Velcro fastener, or you may get a pair of trousers with a nylon draw string around the bottom of the legs. Either style of these trousers is acceptable for aircrew-

member use in spite of personal preferences.

However, if you requisition Nomex shirts, NSN 8415-00-935-4891 (series), these shirts should have a zipper front. Some Nomex shirts manufactured under contract DSAI-00-76-0607, Vanderbuilt Shirt Company, have buttons to secure the front closure of the shirt rather than a zipper. If you receive any of these button front shirts, do not wear them.

We would appreciate it if you would submit a quality deficiency report (SF 368) on the button front shirts to Commander, NARADCOM, ATTN: DRDNA-VCC, Natick, MA 01760. If possible, include one of the shirts as an exhibit along with your SF 368. The shirt will be returned to you after your SF 368 has been processed.

Army Master Data File

For those of you who may have a need for the Army Master Data File (AMDF) and most of you do — AR 708-1, chapter 8 will tell you how to get on distribution.

Also, if you need assistance with national stock numbers that are not listed in the AMDF, or that you feel need to be listed in the AMDF, call AUTOVON 977-7431.

Decompressed Trioxane

A little warmth can be added to your life in a survival situation by using fuel, compressed trioxane, NSN 9110-00-263-9865. You will find this compressed fuel tablet as a component of your survival kits.

The fuel is in a tablet form and is wrapped in heavy foil. However, if for some reason the foil cover gets punctured or slightly torn, exposing the fuel tablet to air, it will decompress or decompose and turn into powder.

The powder may contaminate all other components of your survival kit, and as such it becomes a serious health hazard.

Also, the fuel tablet cover should have a warning label which was inadvertently omitted during production. MIL-F-10805D advises that the fuel cover should have the following label information: "Warning; Harmful if swallowed. Take precaution to avoid contamination of food by loose powder. Cleanse hands after handling."

What this leads to is: *Inspect your survival kit.* If you find that the fuel has turned into powder, remove it from the kit. Wash all items of your kit with warm soapy water. Repack your survival kit without the fuel. Requisition replacement fuel and reinstall it in your kit. We are going to recommend that a small hard cover container, similar to a plastic soap dish container, be made available to place the fuel tablet in for storage in your survival kit. If you get the fuel powder on your hands, wash immediately and thoroughly with warm soapy water.

Antidote—If you should happen to swallow some of the fuel powder—**Do Not** induce vomiting. Drink milk or eat bread or any protein food. Get to the hospital as fast as possible; you are considered a medical emergency.

The results of skin contact by the fuel powder will make the skin white in color, hard and tough.

Winter Survival

Your winter survival depends on two main factors, the determination to live, which is the most important, and the elimination of fear.

Fear is caused by ignorance or inadequate training. However, no amount of training or survival equipment will help without the natural instinct of self-preservation. Aircrewmembers are accustomed to detailed instruction in the form of a checklist for many of their tasks. But in a survival situation, there is no precise or condensed checklist to use. Nevertheless, the four key words you should remember are protection, location, water and food.

The biggest problem with winter survival is probably the loss of body heat due to low temperature and high winds. Adjust your clothing to fit your situation. Move out of the wind, keep careful inventory of your equipment and make a plan of action.

In winter people cannot stay in the open and expect to live unless they are on the move. A shelter of some kind is needed even if it is a hole or trench in the snow. It should be kept in mind that a wind of 10 knots equals a fall in temperature of about 30 degrees Fahrenheit on exposed skin.

The type of shelter to be built depends on the type of tools and material available, snow conditions, and the length of time expected to remain in a particular location. It is extremely important to remember to adjust your clothing while working. Sweating should always be avoided. Emergency signaling equipment should be available at all times, and the campsite should be made as conspicuous as possible from the air.

In general, the survivors should stay close to the point in which they land rather than attempt to fight their way through winter conditions. Having decided to stay, a site must be selected, and the type of shelter to be built decided upon.

You should attempt to stay with your aircraft but not necessarily in it. A crashed aircraft can be a useful aid for identification, as it usually can be seen by the search and rescue (SAR) teams. The aircraft also may provide fuel, oil and material for tools.

Inversion of temperature at night in clear calm weather results in extremely low temperatures in the bottom of valleys. For this reason, your shelter should be built on the side of a valley rather than at the bottom. It also is important to be aware of avalanches in mountainous terrain.

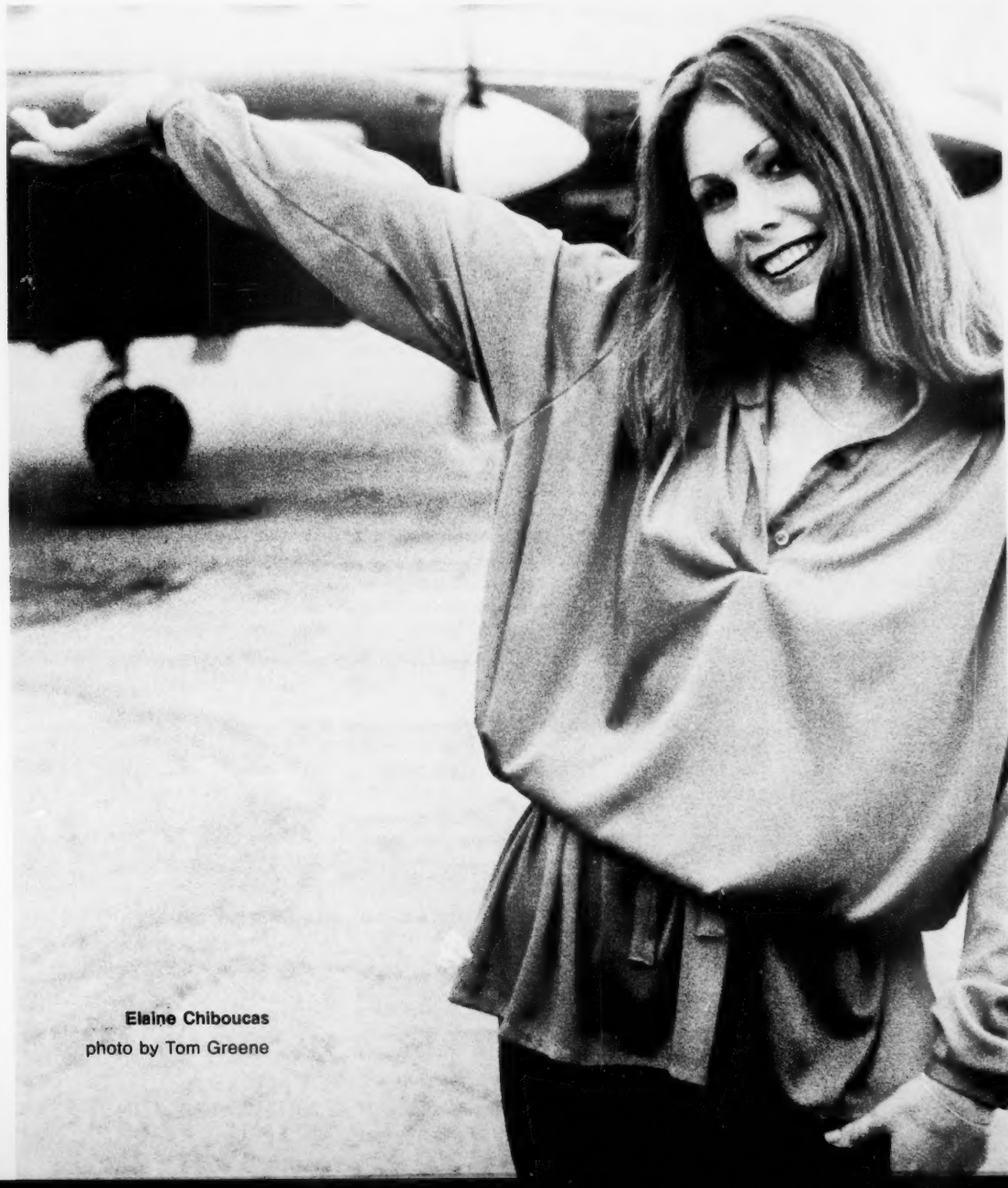
Woodlands are excellent areas for providing build-

ing materials for your survival shelter. Also, snow is a good insulator, and enough should be left when forming the floor. Avoid sleeping directly on the snow. Cover the floor with spruce boughs or foliage. The opening of your shelter should be crosswind.

Snow in the woodlands usually is loose and deep. Traveling can be almost impossible without snow shoes. If possible your shelter should be near a large open area or frozen lake. Tramp out a signal message in the deep snow of the open area, and always have your signal devices or fire ready to signal when you hear or observe the SAR team.

Notable Quote

A large measure of self-discipline is required to complete vital actions with neither error or omission. Unfortunately, commanders can only encourage their subordinates to develop this type of discipline; it is almost impossible to enforce it. Therefore, if self-discipline is not an infallible solution to the problem—what is? ***Air Clues***



Elaine Chiboucas
photo by Tom Greene

EPMS CORNER Enlisted Personnel Management System

To reduce personnel turbulence and PCS costs, in December 1977 the Department of Defense issued a revision of DOD Directive 1315.7, "Military Personnel Assignments." The Army staff is changing Army regulations to conform with that directive. AR 614-30, effective 15 August 1978, has been distributed. Other regulations and changes will follow later this year. This article summarizes the major changes, at both DOD and Army levels, brought about by the new directive

Reprinted from *Focus*

Military Assignments: NEW Directive Outlines Policies

SOLDIERS STATIONED in Hawaii have been considered as being on an overseas assignment (except those who have designated Hawaii as their official residence) and, in most cases, they were returned to CONUS [Continental United States] after completing their prescribed tours. Under the new policy, Hawaii is included as part of the CONUS sustaining base for reassignment purposes. This means than those Soldiers stationed in Hawaii who are nearing completion of their tours—usually 5 or 6 months prior to their DEROS [date eligible for return from overseas]—will be considered along with Soldiers stationed in CONUS for selection as replacements for other overseas areas, such as Germany, Korea, Japan, Alaska, etc.

Priorities for selection of personnel for any overseas assignment are outlined in chapter 10, AR 614-30. These priorities are designed to maintain overseas assignment equity. Soldiers stationed in Hawaii have been placed low on both the long and short tour area priority lists.

Short Tour Priorities

Priorities for selection of replacements for short tour areas are:

- DA approved volunteers, regardless of present assignment (except for drill sergeants who have not completed at least five-sixths of a stabilized tour), provided a requirement exists.
- Personnel with no previous overseas service.
- Personnel in CONUS who have not served previously in a short tour area and whose last overseas assignment was an accompanied tour (normally the Soldier longest back within specialty skill identifier or MOS [military occupational specialty] to be reassigned against requirements).
- Personnel in CONUS whose last overseas tour was an accompanied tour in a long tour area and who previously served a short tour.
- Personnel in CONUS whose last overseas tour was in a short tour area and who were in an accompanied status.
- Personnel in CONUS who haven't served previously in a short tour area, whose last overseas assignment was an unaccompanied tour.
- Personnel in Hawaii after completion of a prescribed accompanied tour.
- Personnel currently in CONUS whose last overseas tour was in a

short tour area and were serving in an unaccompanied status.

- Personnel in Hawaii after completion of a prescribed unaccompanied tour.

Long Tour Priorities

Priorities established for selection of replacements for long tour areas are:

- DA approved volunteers, regardless of present assignment (except for drill sergeants who have not completed at least five-sixths of a stabilized tour), provided a requirement exists.
- Personnel without prior overseas service.
- Personnel serving in CONUS whose last overseas tour was accompanied in a short tour area.
- Personnel serving in CONUS whose last overseas tour was unaccompanied in a short tour area.
- Personnel serving in CONUS whose last overseas tour was unaccompanied in a long tour area.
- Personnel serving in CONUS whose last overseas tour was accompanied in a long tour area.
- Personnel in Hawaii after completion of a prescribed accompanied tour.
- Personnel serving in Hawaii after completion of a prescribed unaccompanied tour.

Even though Soldiers in Hawaii are now eligible for reassignment to other overseas areas, it is anticipated that a minimum number will be so reassigned, as most overseas requirements can be filled by those higher on the priority list.

Career Soldiers (E5-05) serving an accompanied tour in Hawaii who are selected for assignment to a dependent restricted area (short tour) will be eligible for the Homebase/Advanced Assignment Program (HAAP). This means that these Soldiers will be notified of their subsequent assignment prior to departure to the dependent restricted tour. The subsequent assignment may be to CONUS or back to Hawaii, depending on projected Army requirements. CONUS residents will not be involuntarily homebased in Hawaii. The needs of the Army, the Soldier's assignment preferences indicated in the preference statement, professional development, and location of dependents are the primary factors in determining homebase and advanced assignments.

Married Army Couples

Another change in policy as a result of the new directive concerns the overseas tour length for married Army couples.

The DOD [Department of Defense] directive states that married members assigned to the same overseas location will serve the accompanied tour when a joint residence is maintained. However, when the couple does not travel together, the tour of duty of the member who arrives last may be adjusted to coincide with the tour completion date of the first arriving member, provided the second arriving member serves at least the prescribed "all others" tour. Previously, the second arriving member's tour could be curtailed to as little as 12 months provided the resulting adjusted DEROS was the same as that of the first arriving member.

In that many married Army couples who could be affected by this policy change are in the middle of their overseas tours, the Army established 1 April 1978 as the effective date. If the application for a joint domicile assignment was submitted prior to 1 April 1978, the tour length of the second arriving member could be adjusted to the 12-month minimum. Applications submitted on or after 1 April 1978 would result in the second member serving the "all others" tour as a minimum. If neither Soldier is eligible for travel and transportation entitlements, only the "all others" tour is required.

Army implementing instructions have resulted in two other new requirements for married Army couples. Personnel requesting reassignment in order to establish joint domicile must complete at least 12 months at the present duty station prior to departure. This includes reassignment between long tour areas. Also, an individual requesting reassignment between CONUS locations for joint domicile must be able to complete at least 12 months at the new station before ETS [expiration term of service].

Careful career planning and up-to-date preference statements are keys to ensuring that reassignments coincide, within Army requirements.

Other Changes

Other policy changes in the revised DOD directive include:

- No policy will be adopted which requires PCS [permanent change of station] moves within CONUS solely because of passage of a stipulated period of time.
- Assignment procedures will permit tour completion and voluntary extension of tours.

To implement this policy, the Army now allows overseas commanders to approve voluntary extensions to a maximum of 60 months total time incountry (an increase from 54 months). Most extensions of officer tours must be approved at MILPERCEN [Military Personnel Center]. There are some variations based on the overseas area.

In CONUS, a Soldier could theoretically remain at the same installation indefinitely. However, from a practical standpoint, overseas requirements—which still have the highest priority—the need for professional schooling, and unit reorganizations and moves, will cause individuals to move periodically. The amount of time a Soldier spends at a particular CONUS installation will vary depending upon the MOS/specialty.

- Assignment procedures will include consideration of cost. MILPERCEN has programed a "location table" into the Centralized Assignment Procedures (CAP III). This "table" permits computation of the distance involved in moving an individual from one assignment to another to assist managers in deter-

mining PCS costs for each move.

• Career personnel assigned to an unaccompanied short tour will be provided a homebase or advanced assignment. The Army's Homebase/Advanced Assignment Program applies to personnel in grades E5 through 05 and was initiated in January 1976. Since its inception, this program has proved to be not only a valuable moneysaving tool, but also one that has helped remove much of the Soldier's anxiety when selected for a dependent restricted tour.

• First-term, 3-year (or less) members will be given no more than one assignment after initial training unless required to serve overseas, in which case two assignments are permitted. First-term, 4-year (or more) members are eligible for two assignments after training.

• Through the grade of 05 for officers and E8 for enlisted members, promotion will not be the sole reason for PCS reassignment prior to tour completion.

• Individuals declared excess at a particular installation because of unit inactivation, base closure or consolidation, organization and staff changes, or reclassification action will be reassigned to the same installation or to the nearest installation capable of using the individual's grade and skills.

CONUS Tours

The DOD directive specifies that CONUS assignments will be for 3 years or more. However, a 3-year tour shouldn't be viewed as an entitlement, but rather as a tour objective. Army requirements have primacy and cause stability breaks. Authorized exceptions to the directive are:

• When individuals are ordered overseas.

• When personnel are accessed, reassigned for initial skill training or separated.

• When other DOD directives have established other policies. (For example, assignments to the Office of the Secretary of Defense, Joint Chiefs of Staff, Defense agencies and support activities).

• When tenure is limited by law to a shorter period.

• When moves are a direct result of a major weapons change (for example, issue of a new tank or missile) or unit conversion (Infantry to Armor, etc.) and personnel requirements cannot be met without intra-CONUS moves.

• When officers are selected for attendance at senior service college, in which case a 2-year minimum applies.

• When individuals reenlist for another location.

Army Exceptions to Policy

The Army has been granted authority to approve exceptions to tour length policies established by DOD. Those currently approved exceptions include:

• When NCOs [noncommissioned officers] are selected for attendance at the Sergeants Major Academy, in which case a 2-year minimum applies.

• When personnel are selected for nominative positions when these positions cannot be filled otherwise.

• When officers are assigned to ROTC [Reserve Officers Training Corps] duty, the U.S. Army Recruiting Command and readiness regions when these positions cannot otherwise be filled in a timely manner.

• When enlisted personnel assigned as recruiters must be moved to meet requirements in critical recruiting areas or because of ineffective job performance.

• Reassignment of Judge Advocate General Corps officers when it is necessary to ensure that grade, experience and specialty requirements are met.

• Reassignment of chaplains when necessary to meet denominational coverage requirements.

• Reassignment of Army Medical Department officer personnel when necessary to ensure that grade, experience and specialty requirements are met, and to provide for professional growth and development.

• When personnel are reassigned for humanitarian or compassionate reasons under the provisions of AR 614-200 and AR 614-101.

• When earlier reassignment is necessary for officers selected for battalion/brigade command and sergeants major selected for battalion or higher command sergeant major positions. Upon completing the specified command tour length, these personnel will be retained at the same installation when possible.

• When individuals are relieved for cause and reassignment to the same installation is not feasible.

• When Soldiers are disqualified from further service in the Personnel Reliability Program (ARs 50-5 and 50-6) and reassignment at the same installation in primary MOS, secondary MOS or substitutable MOS is not feasible.

• Personnel who volunteer and are accepted for reassignment to ranger, airborne or special forces units; Soldiers who are reassigned within the airborne community to ensure maintenance of readiness in a higher priority unit; Soldiers who terminate jump status and cannot be reassigned to an appropriate vacancy at the same installation; Soldiers completing 18 months of duty in a ranger battalion.

• When enlisted personnel are assigned as drill sergeants, in which case a 24-month minimum CONUS tour will apply.

Personnel assignments that are not in strict accordance with the DOD directive may be necessary in order to meet valid operational requirements and unforeseen contingencies. However, when such assignments are made, MILPERCEN is required to report each of these deviations to DOD.

Summary

The policies in and resulting from the DOD directive are designed to minimize personnel turbulence, reduce PCS costs and maintain a high degree of combat capability and readiness. Within the framework of these policies, every effort will be made, at all levels, to ensure that individual needs and desires are taken into consideration.

ATC ACTION LINE
UNITED STATES ARMY COMMUNICATIONS COMMAND

Visual Separation

It seems to me that by using visual separation in the terminal area much time and fuel could be saved. Why doesn't air traffic control (ATC) automatically provide visual separation when weather permits?

The National Transportation Safety Board (NTSB) recently cited the following three midair collisions in studying visual separation procedures:

"On September 25, 1978, Pacific Southwest Airlines Flight 182, a Boeing 727-214, and N7711G, a Cessna 172, collided in midair over San Diego, CA; 144 persons died as a result. Both aircraft were communicating with air traffic control (ATC) on different frequencies. Stage II service (radar advisory and sequencing for VFR aircraft) was being provided. In response to one of several traffic advisories issued by ATC, the pilot of Flight 182 commented, 'Think he's passing off to our right.'

"On June 28, 1974, Rocky Mountain Airways Flight 323, a deHavilland DHC-6 Twin Otter, and N8105R, a Beech BE-35 Bonanza, collided in midair over Denver, CO; there were not fatalities. Both flights were communicating with the Denver tower at the time. The tower cab was equipped with a BRITE-1 video display, and the controller had both airplanes in visual contact when they collided in the Denver terminal control area. Immediately before the collision, the Bonanza pilot assured ATC that he had the Twin Otter in sight.

"On December 4, 1971, Eastern Airlines 898, a McDonnell-Douglas DC9-31, and N2110F, a Cessna 206, collided in midair near Raleigh-Durham Airport, NC. The two occupants of the Cessna 206 were killed. Both flights were communicating with Raleigh-Durham tower when they collided. The tower cab was not equipped with radar. In response to a traffic advisory issued by the tower, the air carrier pilot commented, 'We just went over the top of him there.'

"Although the circumstances surrounding these midair collisions were different, they have one element in common—in each case, controllers were applying visual separation. Visual separation is a means which may be employed by ATC to separate aircraft in terminal areas. Upon instruction from ATC, the pilot who sees another involved aircraft provides his own separation by maneuvering his aircraft, if necessary, to avoid the other aircraft. When ATC instructs a pilot to employ visual separation, he must keep the other aircraft in sight until it is no longer a factor, as should have been the case in San Diego, or he must follow in line behind another aircraft, as should have been the case at Denver and Raleigh-Durham."

The Safety Board realizes that the visual separation technique is usually effective; however, because of the human limitation and other restrictive factors; it can never be considered completely reliable.

As a result of its study, the NTSB concluded that more positive separation methods must be used to the maximum extent possible in terminal control areas and in terminal radar service areas. Specific recommendations to the Federal Aviation Administration (FAA) were:

"Use visual separation in terminal control areas and terminal radar service areas *only when a pilot requests it*, except for sequencing on the final approach with radar monitoring.

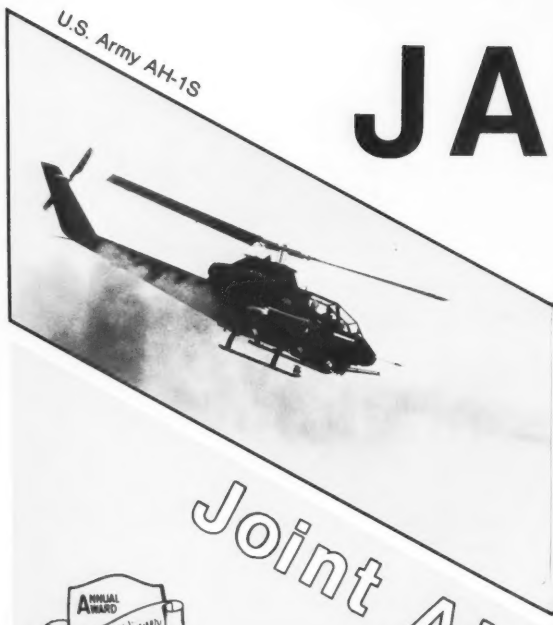
"Reevaluate policy with regard to the use of visual separation in other terminal areas."

Readers are encouraged to send questions to:

Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

JAAT

Joint Air Attack Team



Major Charles Ray
Fort Bragg, NC

MAJ Ray discusses the employment of JAAT tactics by the 1st Squadron, 17th Air Cavalry of Ft. Bragg, NC, working with the 354th Tactical Fighter Wing of Myrtle Beach AFB, SC. For more information see "JAWS" by MAJ Joe Beach in the September 1978 *Aviation Digest.*

ENEMY ARMOR poses a grave threat to friendly troops on future battlefields. But, when A-10s and attack helicopters appear on the battlefield at the same time, in the same location and a Joint Air Attack Team (JAAT) is formed, the enemy is in for a bit of rough going.

JAAT is a combination of Army attack helicopters and Air Force close air support aircraft. They best operate together as a team when formed in concert with the ground commander's scheme of maneuver, and are supported by artillery and mortars and destroy the enemy forces.

JAAT is a new concept and the doctrine still is being written and evaluated. JAAT can augment ground units, and it can operate within the combined arms framework in areas adjacent to or forward of friendly ground forces.

JAAT originally was evaluated for Air Force A-10s and Army attack helicopter companies. But Ft. Bragg, NC's 1st Squadron, 17th Air Cavalry, working with the 354th Tactical Fighter

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Captain John W. Lieberherr
66 FWS
Nellis AFB, NV

The following article is an adaptation of the article, "A Little Warthog In All of Us," by CPT Lieberherr, which appeared in the Fall 1978 issue of *USAF Fighter Weapons Review.* CPT Lieberherr discusses JAWS I and JAWS II exercises. The *Aviation Digest* thanks *USAF Fighter Weapons Review* for permission to reprint this article.

EXERCISES WERE HELD LAST September and November to develop and validate the tactics and coordination necessary to defeat a numerically superior armored force. The exercises were called JAWS (for Joint Attack Weapons Systems), and included A-10s, U.S. Army AH-1 attack helicopters (Cobras), and OH-58 scout helicopters (Kiowas).

At Ft. Benning, GA, in September and at Ft. Hunter Liggett, CA, in November the task was to develop and validate joint tactics so that A-10s and a U.S. Army Combined Arms Team could be employed simultaneously in support of U.S./Allied ground forces. And, since the threat being considered was Warsaw Pact armor, the weapon systems to be employed were tank killers—the A-10 and the Cobra. In addition, the tactics developed had to be functional in an environment which featured sophisticated air defense weaponry, varying terrain and questionable weather.

Though the tests did not include firing live

ammunition or missiles, instrumentation was used to the fullest extent possible to calculate hits or misses. During JAWS I at Ft. Benning, instrumentation was limited to aircraft gun cameras (film and video) but, for JAWS II at Ft. Hunter Liggett every aircraft and vehicle was linked into Ft. Hunter Liggett's unique Range Measuring System (RMS). The RMS calculated hits or misses with precision in time and space and, coupled with the gun cameras, permitted an accurate presentation of the battle. In addition to real time scoring, the illusion of battle was further enhanced by smoke from blank cannon and machinegun fire and the ever present dust churned up by the tracks of rolling armor. By JAWS II, the exercise had become a large, controlled melee, played out among the hills and trees at minimum altitudes. Above all, it worked. Kill ratios of A-10s and Cobras working together soared to four or more times the ratios when employed separately. Vulnerability dropped drastically when all team elements fought in close cooperation.

At Ft. Hunter Liggett, each battle began with a penetration by enemy armor, air defense systems, personnel carriers and aircraft (both fighter and helicopter). Following a call for friendly support, the Air Force and Army commenced their joint attack. Control was exercised through an Army "battle captain" and an Air Force forward controller operating in his own OH-58 scout alongside U.S. Army Air Cavalry. Between them, all firepower, including artillery, was directed at the enemy. Fighting raged for more than an hour. Scout helicopters maneuvered among the trees, trying to spot the enemy air defense threat for the A-10s and Cobras. The enemy commander, operating independently during the tests, tried to clear the skies of the scouts—to the point of using his own attack helicopters in an antihelicopter role. As the Cobras and A-10s approached the arena, using terrain masking to the utmost, they engaged with "stand-off" weapons—TOW (tube-launched, optically-tracked, wire-guided) missiles for the Cobras and Maverick missiles for the A-10s. The enemy unleashed jet fighers against both. The battle became a fast paced series of feints, decoys and attacks—terrain mask, appear, decoy, feint, attack, remask. A scout decoyed a gunner while an A-10 worked over a group of tanks with his GAU-8. A SAM (surface-to-air missile) tried to follow an A-10 but terrain masking broke the radar lock, and a Cobra killed the SAM site with a TOW. A gunner tried to track a violently jinking A-10, working hard to get a shot. He never noticed a Cobra hovering just above the tree line while it guided a TOW in through the back door.

The lessons learned from the exercises took the form of tactics. For example: low level tactical navigation with terrain masking is essential; the optimum A-10 fighting unit is a two-ship, working together but seldom locked into a formation; more than one two-ship can be effectively employed in the target area; minimum exposure is the key to survival; attack coordination between A-10s and Cobras is worked through a battle captain in conjunction with a USAF helicopter FAC; effective communication is the key to success but is also a major obstacle; Cobras and scouts can be used to key targets and pop-up points for A-10s; target priority is air defense weapons, then the tank force; use surprise and shock effect to the maximum extent possible.

Fighting occurred in the morning, debriefing in the afternoon, and data analysis 24 hours a day. The full-scale debriefing included every pilot involved that day: the ground commander, air defense commander, armor commander, fire support commander, and analytical observers. In addition to the RMS data, gun camera film/videotape and transcripts of battle conversations were available. Tactics and techniques were discussed and evaluated with strong and weak points added to the substantial learning gained from most exercises of such size.

All the learning, however, was not restricted to the immediate battlefield. A-10 pilots saw firsthand what it's like to operate off a landing strip that's 3,000-feet long and 75-feet wide. The pilots also experimented with different camouflage schemes, simulating field camouflaging where each squadron carries a "truckload of paint" and paint for different topography and weather conditions. The paint schemes tried were mottled instead of the traditional "sausage" scheme and very easily accomplished by 57TTW personnel. For the first time, everything was camouflaged: missile launch rails, missiles, pylons—and the results were impressive. Though the darker colors were easier to see against a sky background, the A-10s were rarely above the horizon using extreme low altitude tactics.

Other "learning" surfaced throughout JAWS. Fighter pilots learned to "talk Army" (though with some difficulty) and Army learned how to "talk Fighter Pilot" (which is not the same as "talk Air Force"). Respect grew for both sides of the team, friendships were made, and a cooperative attitude appeared. All of which will contribute immeasurably to winning a battle that is not an exercise—a battle that counts—a battle that must be won.

The role of the A-10, a single-place, twin-turbofan aircraft designed for the close air support mission with emphasis on the antiarmor role, is significant in light of the numerical superiority in personnel and armor of Warsaw Pact ground units which confront the NATO forces of Europe. The survivability of the A-10 in the battlefield environment is enhanced over previous systems through the use of armor around the cockpit and critial components, redundant structure, redundant flight controls and "go-home" fuel in self-sealing, foam-filled tanks. The simplicity designed into the A-10 allows it to be serviced and operated from bases with limited facilities close to the FEBA

"JAAT" by Major Ray
continued from page 42

Wing of Myrtle Beach, SC, has initiated training to adapt JAAT techniques for use by the division air cavalry units.

In a series of live fire exercises on Ft. Bragg's ranges, the fighter and helicopter pilots of the two units put the JAAT techniques to work under field conditions in a search for optimum procedures.

In the review of the joint Tactical Air Command (TAC)/Training and Doctrine Command (TRADOC) manual on JAAT tactics, officers of the 17th Cavalry found that little consideration had been given to employment of cavalry armed helicopters under existing concepts. This was taken into account when the joint training sessions with the Air Force were conducted. Air Force pilots had been trained using techniques in the JAAT training circular.

The main difference between cavalry units and regular attack helicopter companies is their mission. Air cavalry units are primarily security and reconnaissance forces. While they do engage in limited offensive operations, air cavalry is not suited primarily for extended offensive operations. They can attack offensively in an antiarmor role during any battlefield posture. The attack helicopter unit is designed to mass a large amount of fires on the enemy for extended periods.

After several days of intensive briefings and training, live fire training commenced and highlighted a number of areas which promised to enhance the applicability of JAAT on future battlefields.

It became apparent early in the exercise, for example, that the cavalry was hampered by

The OV-10A Bronco is the U.S. Air Force version of the North American short takeoff and landing aircraft developed under a triservice program. It performs many missions, including observation, armed reconnaissance, forward air controller operations, helicopter escort, limited ground attack, gunfire spotting for ground forces, target marking, liaison and utility functions. The OV-10A also can be adapted to perform peacetime missions for disaster relief, medical missions, riot control, aerial mapping and spraying operations. The pilot and copilot sit in tandem forward of the propellers and have a virtually unobstructed view from the bubblelike "greenhouse" cockpit

not having a permanently assigned air liaison officer (ALO). The lack of experience and understanding of Air Force operations and organization caused considerable loss of time in coordination of exercise activities.

According to cavalry leaders, an ALO assigned to the squadron would eliminate coordination problems and, at the same time, enhance the cavalry's ability to operate as a member of a combined arms team while in the reconnaissance/security role.

The squadron also identified difficulty in employing close air support (CAS) while operating in the combined arms team. Ostensibly, this deficiency was the result of close air support not being included as a part of the unit's Army Training and Evaluation Program (ARTEP). CAS operations are being included in revisions of ARTEPs 17-205 and 17-385.

Forward air controllers (FACs) were trained as observers in helicopters flying nap-of-the-earth (NOE), a primary flying technique if aircraft are to survive while conducting observation missions forward of the battle area.

In the forward areas with the air cavalry, the JAAT works in the following manner:

Cavalry scouts locate and identify a target. The cavalry will initially coordinate artillery or mortar fire on the target while attack helicopters engage. As the target is developed, the cavalry team leader decides whether or not to call for close air support. If A-10s are available and the ground commander approves their use, a ground FAC may be picked up by the cavalry team and moved forward to the battle area where the close air support is coordinated from an OH-58 Kiowa helicopter. If the FAC is not picked up, the scout team

Some of the aircraft which comprise JAAT include (clockwise from upper left): OV-10 Bronco; A-10s en route to target; OH-58 Kiowa flying NOE; AH-1S Cobra flying NOE flight. (Opposite page): A-10s silhouetted against setting sun

leader will contact the air FAC who will do the function of directing CAS.

The cavalry team leader continues to use artillery and mortars to hinder the enemy's movement, while the attack helicopters destroy the enemy's armor. An airborne FAC, flying an OV-10 or O-2 aircraft well behind the line of contact, serves as a relay for the close air support aircraft. After the FAC has instructed the attacking A-10s about the target they are passed forward to the control of the FAC in the OH-58 or the scout leader. Their job is to coordinate the A-10 fire with the cavalry team so that its effects enhance the ground commander's fires.

The forward FAC or the scout controlling the close air support is a new concept that evolved during the testing of JAAT.

When the A-10 fire on the target begins, the attack helicopters and artillery continue to fire, with the helicopters constantly maneuvering NOE to alternate battle positions under the guidance of the team leader.

When the A-10s break away from the target, the attack helicopters continue to engage until it is destroyed or until the attack is called off.

With initial evaluation of JAAT in an air cavalry environment out of the way, plans have been made to make this type of training routine for units of the 17th Cavalry. Continued refinement of JAAT will provide to the air cavalry squadrons the increased combined arms firepower now available to other Army attack helicopter units.

With this firepower extended forward of the main battle area, the ground commander will be able to strike targets on events much farther forward and with a greater degree of effectiveness than in the past.

Although air cavalry units do not occupy terrain, they can dominate it through the employment of firepower destroying targets and restricting enemy movements. With the increased firepower offered by JAAT, more effective control can be established, making the ground maneuver units' missions easier.

In our constantly changing environment, JAAT appears to be a workable concept for the battlefield.

PLAY IT AGAIN,

WHY IS IT that we in the Army know more about our hobbies than we do about our profession? Does that question stir a little controversy? Then consider this: No Soldier at the post autocraft shop has any difficulty identifying a Toyota from a Ford. Go to the post Rod and Gun Club; no one there has any trouble telling a deer from a goat or a bass from a carp. Now, ask these same Soldiers to tell the difference between a T-10 and an AMX 13.

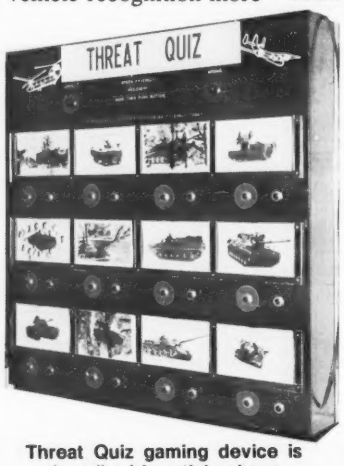
So what? you say. So don't ever let yourself be assigned liaison to a French Armor unit.

One method to help reverse this disparity of knowledge is to make the profession as interesting as the hobby. The recently-formed Attack/Aeroscout Branch at Hanchey Division, Department of Flight Training at the U.S. Army Aviation Center, Ft. Rucker, AL has attempted to make vehicle recognition more interesting by making it a "game." The game consists of a box normally used as an aviation safety quiz device. Training Aids makes them — "Gaming Device, Safety Quiz Board" — FRD 1055, figure 1.

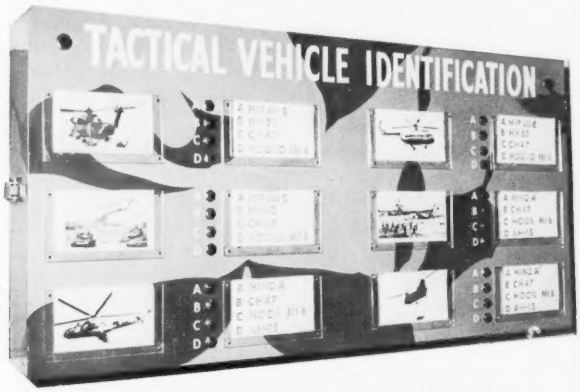
The front of the box has 12 plexiglass slots for 3 × 5 inch cards. Under each slot there are two buttons; one is red, the other green. The green represents friendly; the red is, in this instance, the enemy. Selecting and pressing the correct button will illuminate a green light at the top of the box. Pressing the wrong button illuminates a red light and sounds a repulsive buzzer so that everyone in the building knows someone messed up. Inside the box is the wiring necessary to make it all work and to permit the correct response to be changed periodically.

The real "guts" of the game, however, are the cards or photos in the slots. The aeroscouts cut up several books and "scrounged" photographs until they came up with 12 sets of tests (or 144 pictures). (TC 1-88, "Aviation Recognition Manual," and ***Armor*** magazine are good sources of pictures.)

After everyone has gotten the hang of identifying friend or foe fairly well, the aeroscouts added some more interest by having students correctly name each vehicle. Then when everyone had mastered that art, they made the game even more realistic by obscuring the vehicle with simulated vegetation. They draw trees, other foliage or obvious camouflage on lightweight clear acetate, figure 2. These realistic obscurations were inserted over the pictures, figure 3, and the whole process starts over. Learning to quickly recognize friendly and enemy vehicles and other equipment is an important skill of the aeroscout — this training innovation has helped to make learning that skill both fun and efficient.



Threat Quiz gaming device is described in article above



Tactical Vehicle Identification gaming device is not discussed in above article but is similar to Threat Quiz. This device works on multiple choice method

Figure 1

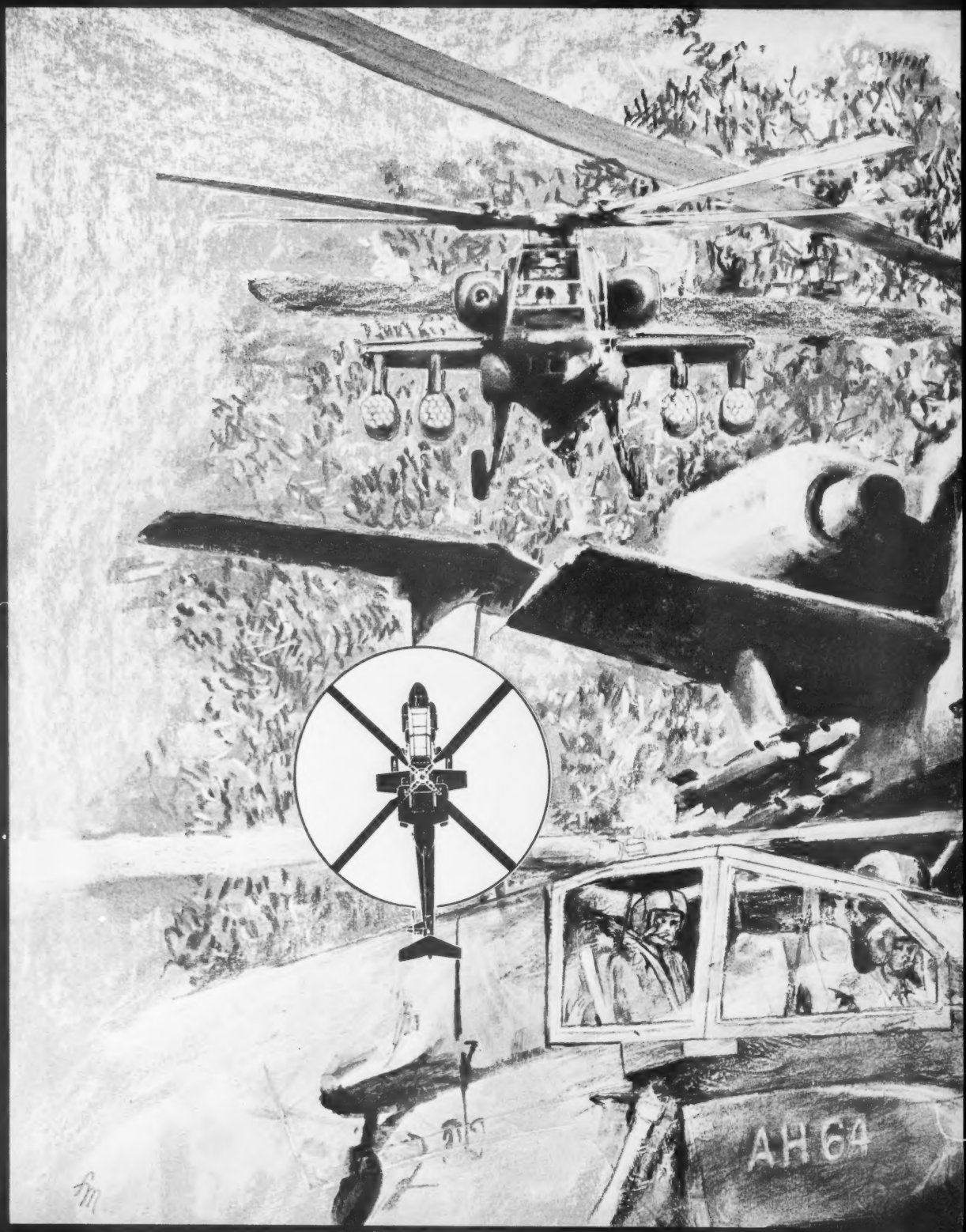
SAM

Captain Frank G. Green
Department of Academic Training
U.S. Army Aviation Center
Fort Rucker, AL

FIGURE 2 — Image to be identified and foliage drawn on acetate

FIGURE 3 — Foliage overlay in place (tank identified below)

TANK: GEPARD, 35 mm Air Defense, Federal Republic of Germany


AH 64